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TM5012R01
Hybrid Intercom Matrix

TM5012D11
User Manual
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NOTES

BEFORE INSTALLING ANY EQUIPMENT, CHECK THAT ALL ORDERED EQUIPMENTS HAVE ARRIVED. IF NOT, CONTACT YOUR SUPPLIER.

THIS MANUAL IS DIVIDED INTO DIFFERENT SECTIONS:

- **INSTALLATION**

PINOUTS FOR INTERCONNECTION.

- **USER**

FUNCTIONS AVAILABLE FOR OPERATION.

- **SOFTWARE**

CONFIGURATION OF AUDIO CROSS-POINTS AMONG PORTS.

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0 HISTORICAL REVIEW

CHANGES CONTROL

Version	Date	Sections Affected	Comments
1.2	05/2008	-	- Manual first version
1.3	05/2009	5.2	- Changes in terms of guarantee.

1 MAIN FEATURES

1.1 FUNCTIONALITY

The Hybrid Matrix TM5012 is compatible with Kroma's range of Digital Intercom System, any other Analogue 4 wires Intercom System and IP Intercom Systems. This provides great flexibility and integration possibilities allowing the user to work with multiple equipments interconnected directly to the Matrix. Each equipment operates independently according to its own functionality and, depending on the nature of the connection established, within the system.

It includes 14 audio ports and input/output data. Comprising of:

- **Four Digital ports** for connection to units of the Digital Intercom System Indico TB7000 Series. It allows connection to a variety of panels such as TP7016/TP7010/TP7210, etc... as well as to any port of the TM7000 Kroma Digital Matrix, and to the digital ports on the TW7100 WIFI Base Station. Digital connection via 4 CAT5 cables (4 twisted shielded FTP pairs) and RJ45 connectors.
- **Four Analogue ports** for connection to Kroma Analogue Intercom System (TB6500 Series) or to any other Analogue 4 wires Intercom System. Compatible with panels such as TP7016/TP6008/TP6024, etc... it can also be connected to any port of the TM6500 Analogue Matrix, or directly to 4 wired beltacks (BP6000 series). Connection is done by 3-pair cables (twisted and shielded) and SUB-D9 connectors.
- **Four IP Protocol Ports** (by Ethernet network) for connection to WIFI wireless beltacks of the TW7100 Series or to other IP ports located at TM5012 Series Hybrid Matrix. Ethernet network connection through 4 CAT5 cables (4 pairs twisted shielded FTP) and RJ45 connectors.
- **Two Audio Ports** with type Mini-XLR connector allowing the connection of headphones via the front panel, with volume control and mute settings. Audio connection via 2 shielded and balanced pairs with Mini-XLR-6p connectors. It includes two auxiliary audio microphone ports. It allows "talk and listen" communication with any port of the matrix.

The communication from each port is individual and full-duplex, allowing simultaneous conversations in both directions. Resolution of 24 Bits audio with Digital filters are used for the Analogue and Digital interfaces.

The audio signal in the analogue ports is balanced to 4 wires without the use of a transformer, allowing inter-connection to any audio equipment working in this format. In this case there is not any control data in the ports, only Analogue audio.

The system status can either be monitored using the key-pad, showing the information on the LCD display, or through the software configuration running on a PC connected directly to the hybrid matrix.

The matrix configuration is made through the serial control (located in the rear) which can be connected to a COM port of a PC. The cross-point connections among ports, the assignation of commands to the panel's keys, as well as the state of the system, are all made possible by the CrossMapper Configuration Software.

The cross-points are implemented in a small local matrix 12x12 capable of enabling any possible 'full crosspoint' combination among the activated ports through the configuration software.

The power supply comes through an external multi-voltage source, with a rear switch on/off (optional redundant source available). As standard the matrix is supplied with just one power supply.

1.2 TECHNICAL SPECIFICATIONS

Dimensions	RACK 1RU/19", depth 190mm
Weight	2,3Kg
Power supply	External DC (Optional redundant power supply) +5,5v / 1500mA, +12v / 200mA, -12v / 200mA Total consumption <13W
IP Net Intercom Port	RJ45 Connector (4 rear NET LINK) Ethernet 10/100BT, Baud rate 10KB/s TCP/IP Protocol, socket UDP, with Kroma PRTP
Digital Intercom Port	RJ45 Connector (4 rear DIGITAL PORT) 44,1Khz sampling, 16 audio bits + 8 data bits Kroma Intercom Protocol 2Mbit/s
Analogue Intercom Port	SUB-D9M Connector (4 rear ANAG. PORTS) 4 wires Balanced Audio, without transformer Nominal level 2dBv Max level 10dBv Impedance 600Ω output, 15KΩ input Bandwidth 150Hz-10kHz SNR > 80dB THD < 1% 4dB
Audio Monitor Port	Mini-XLR 6p Connector (2 frontal HEADSET) Power mic. Elect. 3v3, 1k impedance Mic. amplifier +50dB Differential input mic. -19dB Max. Amplifier speaker max. 5dBm with >100Ω
Control serial Port	RJ45 Connector (1 rear CTRL) RS-232 data, 57.600Hz, without parity, 1 stop, No control
IP Net Control Port	RJ45 Connector (1 rear LAN) Ethernet 10M, web server HTTP

2 INSTALLATION

2.1 SYSTEM OUTLINE

The TM5012 Matrix has been designed to interconnect all kinds of matrixes and panels, from both the Kroma Digital and Analogue range, as well as any other Analogue 4 wires Intercom System. All this demands a mixed architecture, where any port can behave either as a terminal to connect to other external matrixes or as a matrix to service the panels.

The System configuration varies depending on the equipment to be interconnected. Three connection types are available:

- **IP Connection** by Ethernet network to audio elements with IP protocol, such as WIFI beltpacks or to another remote IP matrix port.
- **Analogue Connection** to TP6000 Series panels such as TP7016/TP6008/TP6024, or to Analogue matrix ports TM6500 Series as well as to any 4 wires Analogue equipment.
- **Digital Connection** to TP7000 Series panels such as TP7016/TP7010/TP7210, to ports on a Digital matrix such as the TM7000.

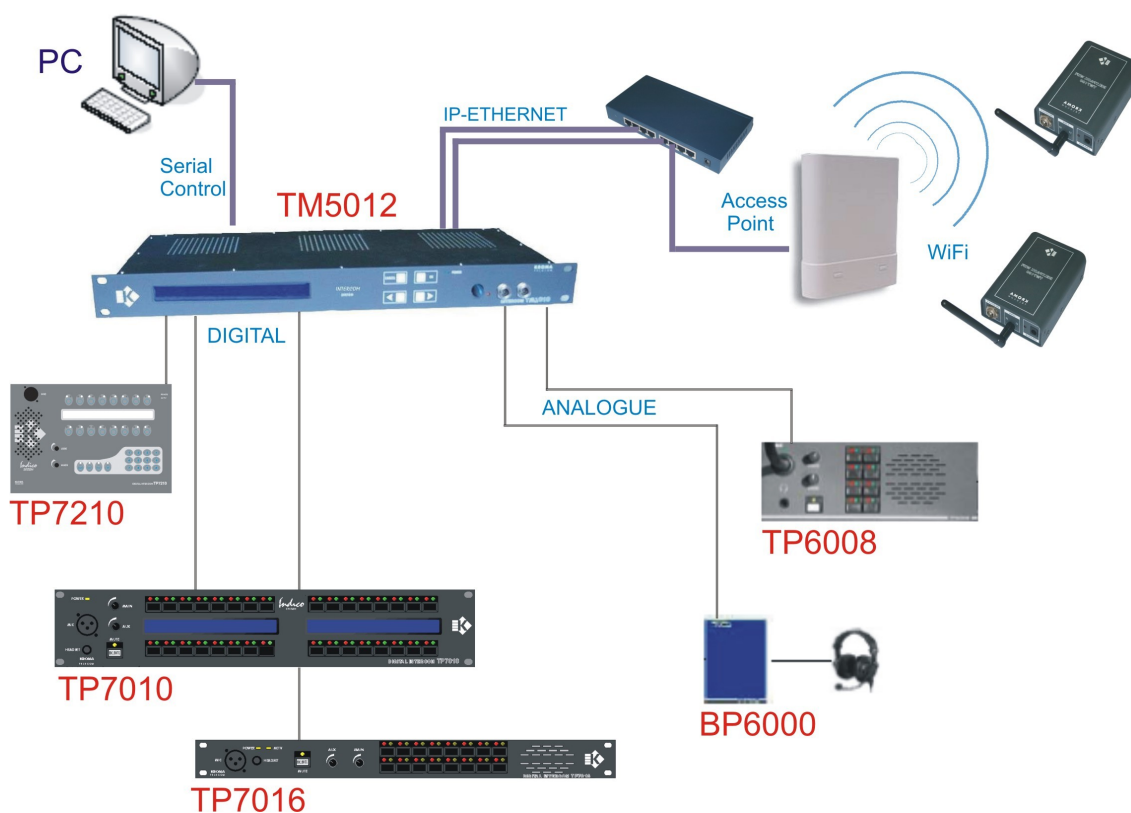


Figure 2.1 Example of Analogue & Digital panels & Wifi Beltpacks Interconnections

The example shown in Figure 2.1, displays the possible Analogue & Digital interconnections via an IP network to the TM5012 Hybrid Matrix. The system consist of several Digital panels, Analogue equipment and wireless WIFI beltpacks directly connected to the matrix (by Access Point).

The audio cross-point map among the equipments is internally implemented in the TM5012 Hybrid Matrix. Firtsly, a PC (computer) is also needed to configure the system's map, which is done using the CrossMapper software.

All panels have their own cross-point and will programme them, regardless of the panel type. The leds of the keys stars according to the configured command in each case.

As the TM5012 includes 4 Digital ports it is possible to configure up to four terminal equipments. These could be panels, interface cards or ports of the TW7100 Wireless Base Station. The same applies to the 4 Analogue ports, where either Kroma panels or any other Analogue 4 wires equipment can be connected.

WIFI Wireless Beltpacks can be configured in the four IP network ports, in order to either work directly integrated without their base station, or be connected to another IP network port on another remote hybrid matrix, allowing an audio link through IP as shown below.

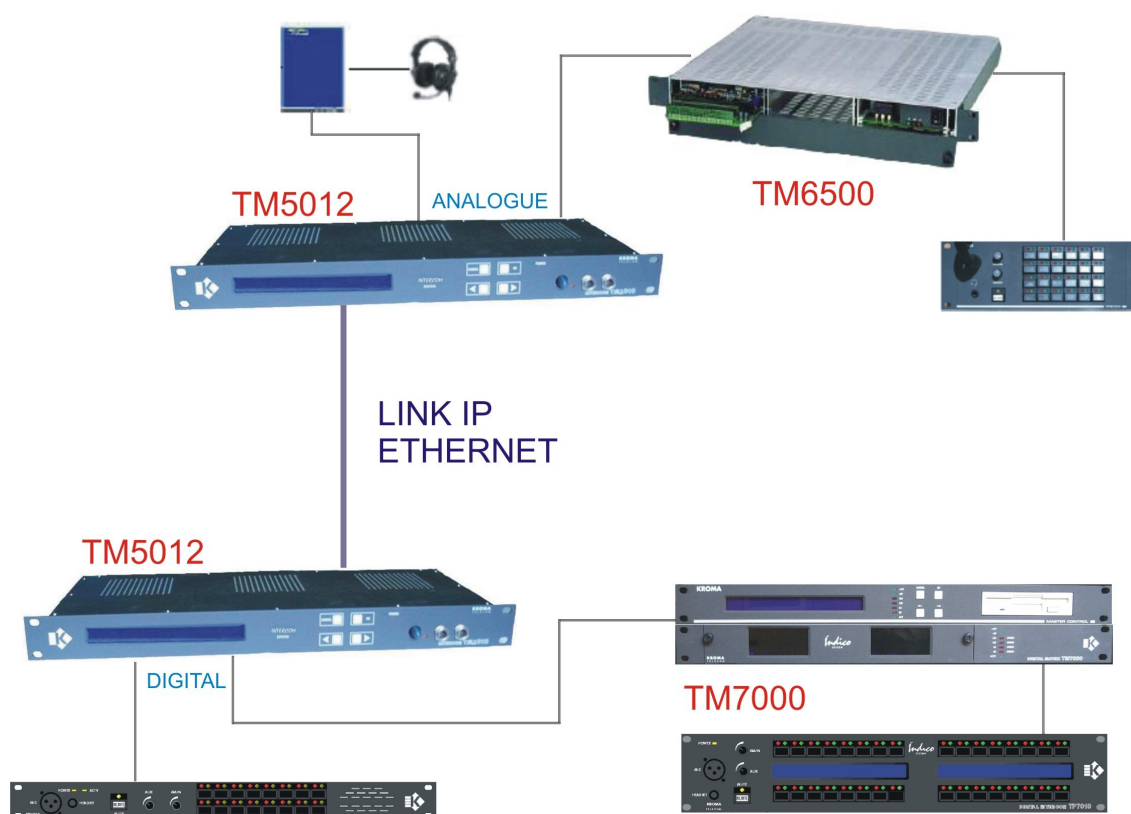


Figure 2.2 Example of System Interconnection by IP link

The previous example shows a possible interconnection between two Intercom Systems, one Digital and the other one Analogue, interconnected through an IP port of each of the TM5012 Hybrid Matrixes. Both systems are located remotely each other such as different cities or similar, but there is a connection through an audio IP port.

In this way, local system users are able to keep an audio communication with the remote users of the other Intercom System.

Another connection possibility is to integrate the WIFI Wireless Intercom TW7100, through the digital ports of the Hybrid Matrix TM5012, where the WIFI Base Station TW7100 and the Hybrid Matrix TM5012 are interconnected through Digital ports carrying audio and data.

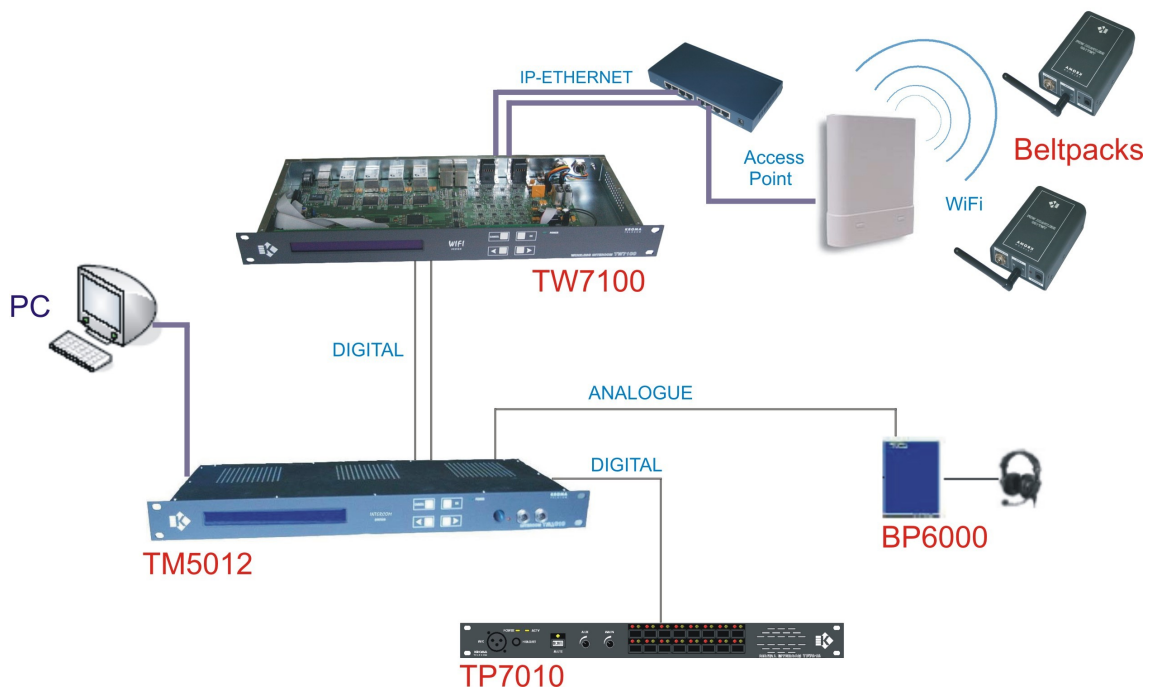


Figure 2.3 Integration Example of some Wifi beltpacks to matrix

The remaining ports of the Hybrid Matrix TM5012 are available for other connections such as Analogue panels, IP, etc. The user will configure the cross-points map in the Hybrid Matrix TM5012, and will see the WIFI beltpacks as elements transparent to the system. For further information on TW7100 WIFI please review your technical manual.

2.2 POWER CONNECTION

The equipment should be placed in a rack mount. Kroma recommends leaving an empty place (1 UR high) right over the equipment to allow ventilation, but it is not strictly necessary.

NOTE: The equipment should be unplugged during installation. Once this process is completed proceed to plug it to the external power supply.

It is powered by multi-voltage DC (+12v,-12v y +5,5v) through 'DIN' connectors located at the rear left, labelled as "POWER". The voltage of the pin connectors are as follows:

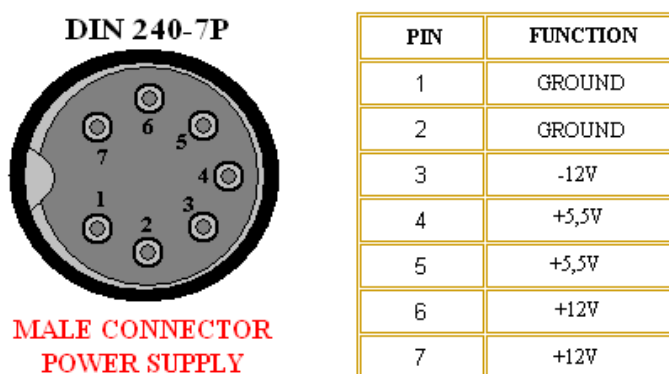


Figure 2.4 Matrix TM5012 connector Pins DIN powered

As standard, Kroma supplies an external power supply unit (PS2400X11 EUR or similar). It comprises a voltage cable on one end and on the other end with a female DIN socket to be plugged to the male DIN connector at the rear of the matrix. There is the possibility to order another redundant power supply (optional order). When there is only one power supply unit available, there are two possible choices of connection: Plug A or B.

In order to avoid a possible accidental unplugging, it is advisable to screw and manually tighten the external piece covering the unit socket.

Once the power supply unit is on place, move the vertical switching (located next to the power supply connectors) to the lower position: ON. Move the switch to the top position: OFF to turn it off.



Figure 2.5 Rear view TM5012 matrix

2.3 PORTS CONNECTION

Besides the two power connectors above described, the equipment counts with: a set of four IP Protocol Ports, another set of four Digital port connectors and lastly of four Analogue ports set. Each one of the ports can be either connected to another port of the matrix or to terminal equipment.

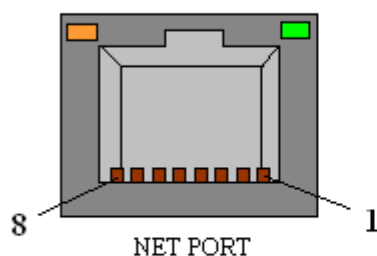
Find below the pin-out description for each group connector as well as a feasible cable connection to the equipment, which in turn determines whether the wire would be pin to pin or crossed pin.

A) IP NET PORT CONNECTION



Figure 2.6 Connection of Ethernet net port

These IP net ports are named link ports and are labelled as Net-0, Net-1, Net-2 and Net-3. The type connector is RJ-45 with the following pin-out:



PIN	FUNCTION
1	TX +
2	TX -
3	RX +
4	NOT USED
5	NOT USED
6	RX -
7	NOT USED
8	NOT USED

Figure 2.7 Ethernet net pins

The IP net ports should be connected to an Ethernet switch, to shape a local net area (LAN), exclusive to the IP intercom systems. This is why, for any net port (NET) to be used in the matrix, the cable has to be connected pin to pin, between the net port and the switch.

For each Ethernet port available at the base, there are two leds; one the orange colour, is on whenever a net connection is detected and the other is green indicating data transfer on process.

NOTE: Once the net ports wiring is set, the orange led will show whether the ports are working properly. If they are connected to Ethernet net, the orange led will be on.

See the advised match colour/ pin-out below:

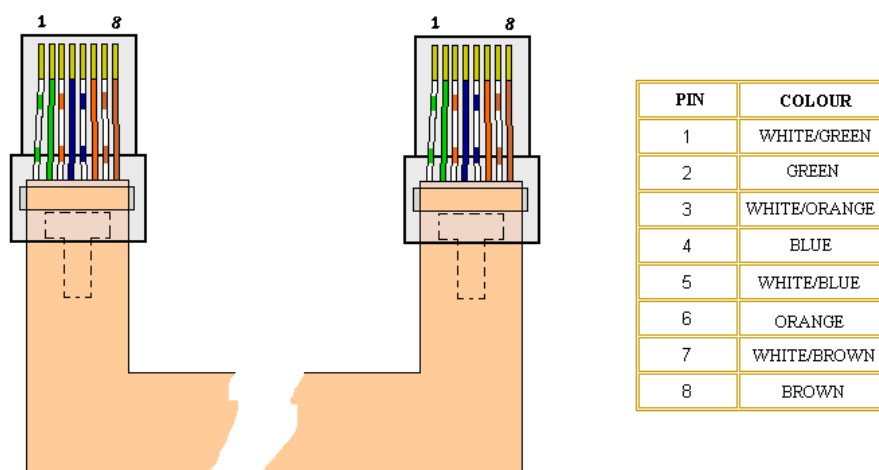


Figure 2.8 Ethernet port connection cable

It is recommended to use a data wire for the local net, with 4 twisted pairs and shielded set, FTP CAT5 type. The wire maximum length is 200m (more or less).

B) DIGITAL PORT CONNECTIONS

This set of ports is labelled at the rear as DIGITAL PORTS and are numbered as 0, 1, 2, and 3. They use RJ-45 connectors with the following pin-out.

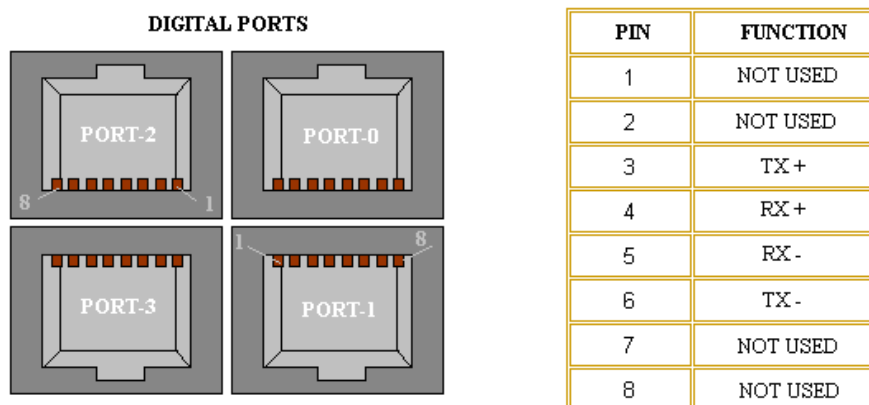


Figure 2.9 Digital port pins

It is necessary to use two different types of wiring (pin to pin or twisted as per requirements' of equipment connected to the TM5012 hybrid matrix). This is due to the Digital ports' double functionality, where they can be connected either to a Digital matrix or to a Digital panel

B.1) Connection between a TM5012 Digital port and a TM7000 matrix port.



Figure 2.10 Digital connection between TM5012 and TM7000

The Digital port of the TM5012 matrix behaves as a Terminal (function). This connection is carried out using a **pin to pin** cable, with RJ45 connectors on both ends, as shown below.

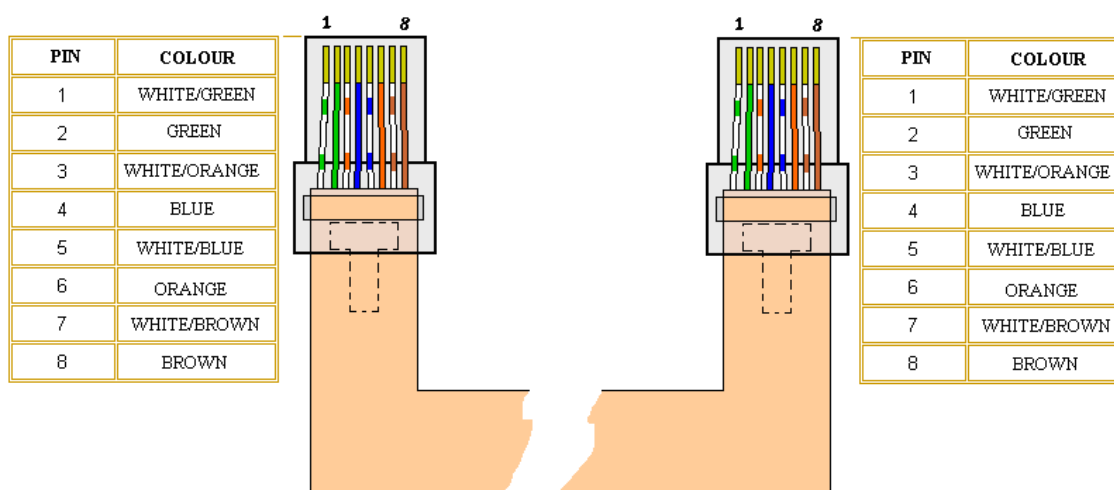


Figure 2.11 Connection cable between a TM5012 digital port and TM7000 Digital matrix

It is recommended to use a data wire for the local net, with 4 twisted pairs and shielded set, FTP CAT5 type. The wire maximum length is 300m.

One end of the cable is plugged to the RJ45 of one of the TM5012 ports. The other end is connected to the required TM7000 Digital matrix port.

B.2) Connection between a TM5012 digital port and a TP7000 panel or a TW7100 base station port.



Figure 2.12 TM5012 and TP700 Digital Connection

The digital port of the TM5012 behaves as matrix and the connected equipment as terminal. Such connection can be used for: TP7010, TP7016, TP7210, TP7100 digital panels, GP7020, TA7000, TD7000 interfaces or to connect TW7100 WIFI ports from the base station (the digital ports of the wireless base will behave as terminals).

The above connection should be carried out through a cable of twisted pair pins and RJ45 connectors on both ends, with the below pin diagram:

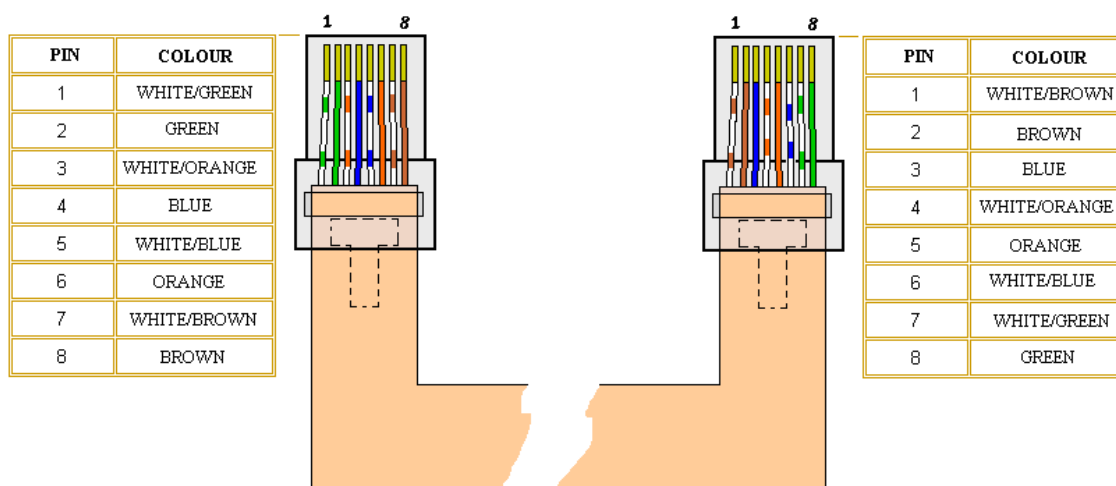


Figure 2.13 Connection between TM5012 digital port and a TP7000 terminal

It is recommended to use a data cable for the local net, with 4 twisted pairs and shielded set, FTP CAT5 type. The wire maximum length is 300m, equal to the maximum allowed distance between a matrix and a digital terminal.

One wire end connects to the RJ45 plug (of one of the TM5012 ports) and the other end to the intended port number of the TM7000 digital matrix.

C) ANALOGUE PORTS CONNECTION

This set of ports is named ANALOG PORTS (labelled at the back). They are numbered as 0, 1, 2, and 3. The data control flows on 1-2 pins, whereas the input/output audio differential flows in the 7-8 and in the 4-5. This set uses SUB-D 9P plug connectors with the following connector:

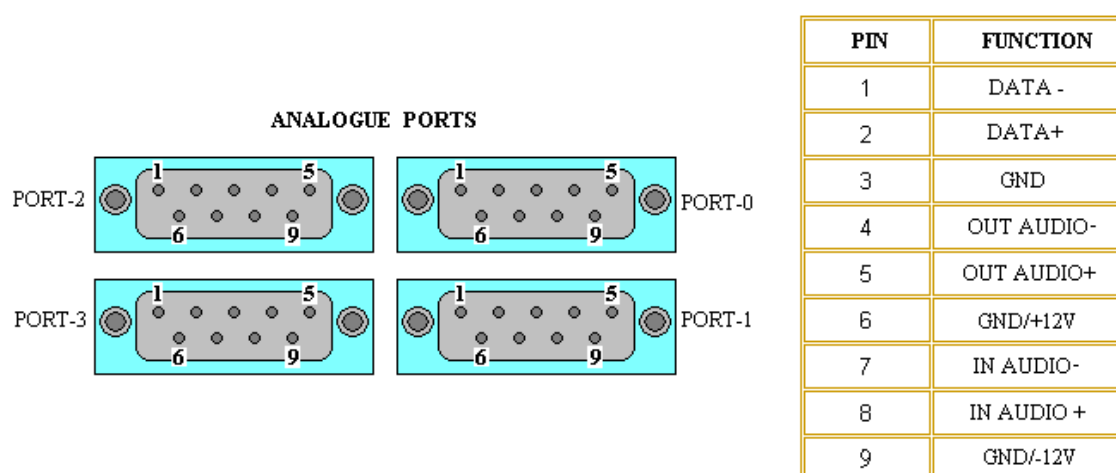


Figure 2.14 Analogue ports pins

NOTE: The in/out audio pins not isolated with transformers, reason why, without the outside adaptor, is not possible a direct connection to external 4 wires lines.

The 6 & 9 pin connectors of the TM5012 matrix, can either present an earth configuration or a positive (+12v) and negative voltage (-12v) in order to power other external equipment through its own wire (e.g. power the BP6000 Analogue beltpack)

As default setting, these pins are configured to earth (GND).

NOTE: If the system provides to the user, includes the audio concentrator CE6000 or the beltpack BP6000, then the matrix TM5012 will selected from factory with voltage in this pins .

This configuration can be modified by lifting the central part of the soldered SMD jumpers of the printed circuit matrix.

Analogue Ports 0 & 1 → Jumper J19 : Selection between GND & +12v
→ Jumper J15 : Selection between GND & -12v

Analogue Ports 2 y 3 → Jumper J20 : Selection between GND & +12v
→ Jumper J16 : Selection between GND & -12v

For instance, to power a BP6000 analogue beltpack (e. g. installed in the analogue port no 2 of the TM5012) the jumpers will have to be moved (J20 and J16 in this example).

NOTE: Whenever the SMD jumpers are altered in order to be powered +12v/-12v via an analogue port, two ports are affected at once: either 0-1 or 2-3.

It is necessary to use two different types of wiring (pin to pin or audio twisted as per requirements of connected equipment to the TM5012 hybrid matrix). This is due to the Analogue ports with double functionality, where they can be connected either to an Analogue matrix or to an Analogue panel.

C.1) Connection between a TM5012 Analogue port and a TM6500/TM6000 Analogue matrix.



Figure 2.15 Analogue connection between TM5012 and TM6500 matrix

The TM5012 matrix's analogue port behaves as Terminal. Connection should be done using a pin to pin cable (with the exception of the 6 & 9 pins) with 9 pin SUB-D

connectors on both sides. Therefore, the interconnection wire ends in a male SUB-D 9P connector on one side and a female SUB-D 9P connector on the TM5012 hybrid matrix's end. See below the pins match and functionality (from the wire connectors' side).

PIN	MALE SUB-D9 TO TM6500 MATRIX	CONNECTION		WIRE GROUP	FEMALE SUB-D9 TO TM5012 MATRIX	PIN
1	Data -	1	1	C	Data -	1
2	Data +	2	2	C	Data +	2
3	GND	3	3	C	GND	3
4	Audio IN -	4	4	A	Audio OUT -	4
5	Audio IN +	5	5	A	Audio OUT +	5
6	-	3	6		-	6
7	Audio OUT -	7	7	B	Audio IN -	7
8	Audio OUT +	8	8	B	Audio IN +	8
9	-	3	9		-	9

Table 2.1 Analogue connection cable between TM5012 matrix and TM6500/TM6000 matrix

Use a LAPP KABEL UNITRONIC Li2YCY PiMF 0034046 3x2x0.34 as suggestion of reference cable.

Note that: 3, 6 & 9 pins of each analogue port of (TM5012 matrix) should be soldered together with the same pin: 3rd of the analogue port of the TM6500 matrix in order to connect pins to ground. Pins 6 & 9 (from TM6500 side) should be left unplugged, as they are for power purposes.

NOTE: For further information on the TB6500 intercom system it is advised to check the TB6500 technical manual, available on the supplied CD.

The recommended maximum distance between matrixes should be less than 150 m, (otherwise, the noise and possible transmission errors would increase).

C.2) Connection between an analogue port of the TM5012 and a TP6000 (or similar) analogue terminal.



Figure 2.16 Analogue connection between TM5012 and TP6000 terminal

The analogue port of the TM5012 behaves as matrix and provides data and audio service to the terminal boards connected to its ports. This is the link used to connect

TP6008, TP6024, CP6032 analogue boards, BP6000 beltpacks and EL6000, EL6001, CE6000 & HN6000 interfaces.

NOTE: *If the equipment to connect to the analogue port of the TM5012 is an analogue beltpack (BP6000), then, the internal jumpers should have to be configured allowing remote power of the beltpack through the pins no 3 & 6, as explained before.*

The connection between an analogue port of the TM5012 matrix and a TP6000 panel or similar should be done using a cable with SUB-D 9P female connectors on both ends. See below the pins match and functionality (from the cable side).

PIN	FEMALE SUB-D9 TO TM5012 MATRIX	CONNECTION		WIRE GROUP	FEMALE SUB-D9 TO TP6000 PANEL	PIN
1	Data -	1	1	C	Data -	1
2	Data +	2	2	C	Data +	2
3	GND	3	3	C	GND	3
4	Audio IN -	4	7	A	Audio IN -	4
5	Audio IN +	5	8	A	Audio IN +	5
6	GND/+12v	6	6		GND	6
7	Audio OUT -	7	4	B	Audio OUT -	7
8	Audio OUT +	8	5	B	Audio OUT +	8
9	GND/-12v	9	9		GND	9

Table 2.2 Analogue port connection cable between TM5012 matrix and TP6000 panel

Use a LAPP KABEL UNITRONIC Li2YCY PiMF 0034046 3x2x0.34 as suggestion of reference cable.

The 6 & 9 earth bound pins from the end of the matrix are linked with the 6 & 9 pins from the other end of the panel. The differential audio from one end of the wire reaches the other end (crossing the entrance with the exit: 4-5 pins & 7-8 pins).

The same analogue port is ready for direct connection with a BP6000 wired beltpack. In this case, the 6&9 pins (+12V/-12V) have to be linked (after modifying the internal Jumpers (SMD)).

NOTE: *When a TM5012 analogue port is configured remotely powered (by the 6 & 9 pins), the pins of the other associated port should not be connected, as this would cause a short circuit in those tensions (through its link to the panel, as discussed on part C).*

C.3) Analogue audio connection between a port of the TM5012 and an equipment than works with balanced 4 wires.



Figure 2.17 Example of a analogue connection TM5012 and 4 wires equipment

The analogue port of the TM5012 matrix is audio linked (not data) to a generic balanced 4 wires equipment. **The analogue ports of the matrix do not have input/output insulated for the transformer.** You must not connect direct to external lines 4 wires, if not used an interface such as EL6000, for isolating between grounds.

For balanced audio signals at 4 wires, the port can be used directly after connecting the referent (GND) to earth.

The link between an analogue port of the TM5012 matrix and an audio balanced equipment is done through a cable in which there is a SUB-D 9P female connector on one end (for connection with the matrix) while the other side ends in the audio equipment. See analogue port pins functionality below.

PIN	SUB-D9 MALE TM5012 MATRIX
1	-
2	-
3	GND
4	Audio OUT -
5	Audio OUT +
6	GND/+12v
7	Audio IN -
8	Audio IN +
9	GND/-12v

Table 2.3 Analogue port pins

In this case the audio is wired, but not the data.

NOTE: The 6 & 9 pins of the analogue port of the TM5012 matrix, have been earthly configured (GND standard), otherwise it should only be earth bound the pin n° 3 (GND) to the audio equipment

2.4 FRONTAL AUDIO CONNECTION

The TM5012 hybrid matrix has 4 net ports, 4 digital ports and 4 analogue ports. All of them located at the rear of the equipment. It includes as well, two auxiliary audio microphone ports, located in the front panel, which can be configured, using the configuration software (cross-points).

A sub-menu on the front display together with the selection keys allows an individual choice of the particular port to communicate.



Figure 2.18 Audio front ports

The input/output audio connector is Mini-XLR type of 6 pins, could take a microphone, as it has a *phantom load* for microphone capsules, such as electret (3v) as well as an internal preamplifier. The audio output could be connected to a small speaker 8Ω, 500mW of maximum power.

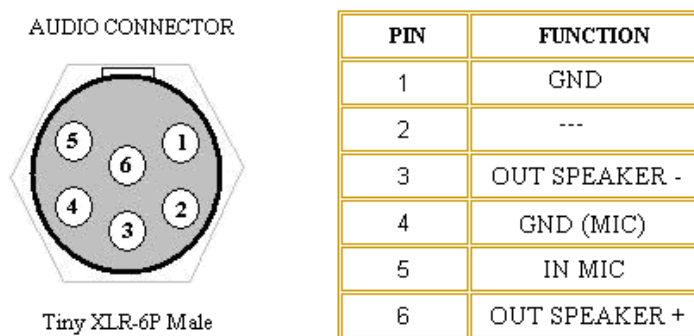


Figure 2.19 Audio front connector pins

A multiturn button controls the listen in the audio volume. Microphone input mutes when pressing the multiturn control. The led located on the right will be on whenever the mute function is selected. To unselect this option just push again the multiturn button (the led will then be off). So, this control affects the listening of both audio ports.

NOTE: As soon as the maximum and minimum listening level are reached (using the multiturn button) the above mentioned led would flash.

The **MC7000X03**, micro-headset, is available as an option to use directly. It has electret microphone and one-ear speaker.

2.5 SERIAL CONTROL CONNECTION

The cross management software '**CrossMapper**' is used to configure the cross maps and the system condition. The configuration file provided by this software, should be uploaded to the matrix by the serial port at the rear of the equipment: tagged as CTRL. It should be linked through a cable to the COM serial port of a PC (computer).

The remote connection with the PC by using a RS232 (through private protocol) See the serial connector pinout below.

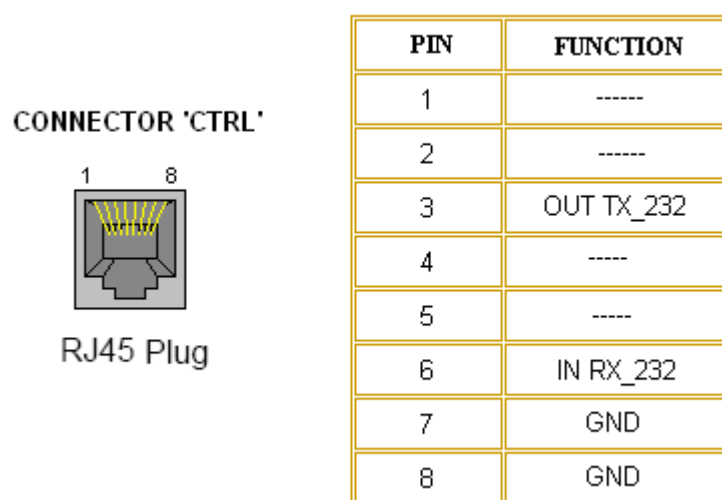


Figure 2.20 Pins of serial connector

The linking cable should be: on one end an RJ45 jack connecting to the serial port of the TM5012 matrix and on the other end a female SUB-D 9P connecting to the COM port of the PC. See pins below.

PIN	RJ45 JACK TO TM6500 MATRIX	CONNECTION		FEMALE SUB-D9 TO 'COM' PC	PIN
1	-----			-----	1
2	-----			RX232	2
3	TX232	3	2	TX232	3
4	-----			-----	4
5	-----			GND	5
6	RX232	6	3	-----	6
7	GND	7	5	-----	7
8	GND	8	5	-----	8
				-----	9

Table 2.4 Linking cable CTRL serial port to a PC

3 OPERATION

The hybrid matrix comprises of 4 digital ports, 4 net ports, 4 analogue ports and 2 auxiliary audio ports. From this, it is necessary to define the audio cross-points for those ports, which will be done according to the customers needs.

As mentioned before, the cross-points are set on the configuration map, using the 'Crossmapper' configuration software. The configuration map is uploaded to the matrix, stored and carried out.

There is a led located on the front of the matrix which indicates whether the equipment is on. It is marked as POWER.



Figure 3.1 TM5012 matrix front view

There is a LCD display on the front together with 4 user-interface keys to control the system. On the right side there are located the input/output audio monitor, (headphones ready) together with a listening volume control set.

See below functionality of the front keypads:

- 'OK' → Validate the chosen option or progress on the current menu.
- 'CANCEL' → Cancel the chosen option or return to previous menu.
- '=>' → Progress right/down the selection cursors.
- '<=' → Progress left/down the selection cursors.

3.1 MENU

As soon as the matrix is powered (rear switch: ON), the display on the front of the equipment shows: 'Start up' (it indicates configuration of the internal devices).



Figure 3.2 Matrix starting

If there is no error, the first screen is as shown below.



Figure 3.3 Introduction screen

On the top will show the name of the equipment as well as the software version. Below, within square brackets, the cross map active at that time will show.

Should happen not to be an active configuration map or the last active one should happen not to be valid, then, it will show [-----].

Find below the operative description.

NOTE: *LCD screens described in this manual are in Spanish. On the actual equipment, the user selects the language setting, either English or Spanish.*

To access the options menu press once the <OK> key:

- (1) Audio Management
- (2) Port Status
- (3) System Configuration
- (4) Reset

Each menu has sub-menus, which will be explained on detail.

- (1) Audio Management

This first menu allows audio management in order to establish the cross-points between the ports of the matrix. Such cross-points are additional to the ones defined by the configuration map, as they are not assigned by commands, but as fixed crosses (equivalent to the IFBs from the configuration software).

NOTE: *Before assigning cross-points, the configuration map must be defined and downloaded (from the CrossMapper).*

Therefore, the configuration software should be used to make a new map and after to assign cross-points through this way for changes quickly implemented.

To do the above, press <OK> to validate the 'Audio management' option. It will display the available options to establish the crosses (XPTs) among the net ports, the digital ports, the analogue ports and the front audio ports.



Figure 3.4 Audio management menu

Should happen not to be any active configuration map, the 'Crosspoint assignment' option will not be available then. In that case, a new map should be downloaded from the software.



Figure 3.5 XPTs operative menu

The available ports sets are defined below by this utility:

- DIGITAL SET → 4 Digital ports.
- ANALOG SET → 4 Analogue ports.
- NET SET → 4 IP net ports.
- HEADSET SET → 2 Front microphones ports.

The audio input & output ports should be selected previously to the set up of any audio cross-point.

First of all, the communication source port should be selected with the <OK>. The activated ports are shown on the display, together with its mnemonic, according to the port type (DIGITAL, ANALOGUE, NET AND MICRO).



Figure 3.6 Source port selection

By the rows '<=' and '>=', to select the port of origin (input). Once this is done, validate with the <OK>. After this, the final destination port/s (targets) should be assigned, to set up the cross-point.



Figure 3.7 Target port selection

Pressing the <OK> and using the '<=' and '>=', to display the possible destination ports. With the symbol [●], the target ports had been selected.

Once all necessary audio cross-points are set, the <CANCEL> key will return from the menus, right until the option needed to save the configuration (the cross-points configuration) either permanently or temporally (until end of power).

Selected the option 'YES' to enable the configuration map to be saved permanently.

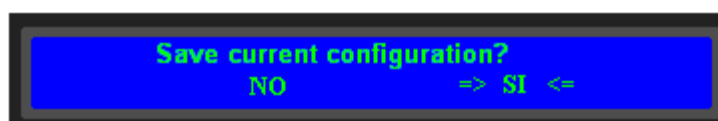


Figure 3.8 Save the cross-points map

To save the configured map, a free bank of the four available on the display has to be selected. Should we choose a bank previously used, the new map will overwrite the old one.



Figure 3.9 Selection of the bank to save the map

The <OK> validates and save the map in the chosen bank.

There are 4 configuration maps capable of being activated, saved or erased. The option 'Activate map' run a cross-point map already stored in a bank of the memory.



Figure 3.10 Activate stored map

The <OK> validates the required map and run the stored cross-point map.

NOTE: If the message "Map Error" appears on the display, it will mean that the required map is not compatible with the current software version running on the matrix. In that case, use the CrossMapper configuration software to check the map software version and in turn, check it against the matrix edition.

To save the current configuration, chose 'Save map'.



Figure 3.11 Save configuration map

Whenever a change is done on the cross-point map, select a free bank and press <OK> to permanently save it.

If a map is erasing, it will liberate a place on the memory (a bank) for future configuration maps, which is the last functionality on this menu.



Figure 3.12 Erase the map from the memory

Select 'Delete map', then chose the required map out of the 4 possible and validate with <OK>.

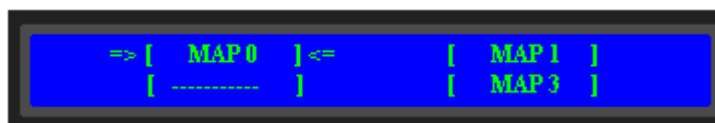


Figure 3.13 Map selected for erasing

- (2) Port Status

This menu allows the possibility to check the status of the connection of all ports: digital, analogue, net and microphone ports. This option will only be available if a map is active on the matrix.



Figure 3.14 Status of the ports

Press the <OK> to access the menu to see the current connection status of all active ports on the current map.



Figure 3.15 Matrix ports status

The status of the port is shown in real time, at the bottom of the display with the following nomenclature:

Port type + 'Port No' [Equipment - Nnemonic] Message

Fields:

- Port Type → Identification of the port:

'D' => Digital Port.

'A' => Analogue Port.

'N' => Net Port.

'H' => Front micro Port.

- Port No → Port number:

'0' => First port labelled as '0'.

'1' => Second port labelled as '1'.

'2' => Third port labelled as '2'.

'3' => Fourth port labelled as '3'.

- Equipment → Commercial name of the equipment connected to that port.
- Mnemonic → Identifying name of the equipment, declared in the configuration map.
- Message → Info. message regarding the port status:

'OK' => Appropriate working: the port operates adequately to the protocol data.

'ERROR' => Incorrect working: the destination equipment is not working for that port or is not connected. To check the port.

'WARNING' => Appropriate working. It informs of either a mismatch of the destination port and the declared port in the configuration map or incompatibility on software versions.

'UNKNOWN' => Unknown status. The port status is not known because of that port have not data protocol, only audio. E.g. Microphony ports.

- (3) System configuration

This is the third menu, comprising the generic options (parameters) available for configuration on the matrix. Press <OK> to display the sub-menus.

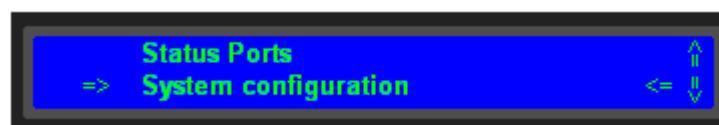


Figure 3.16 Configuration Menu

The first submenu refers to the language settings of each menu.



Figure 3.17 Language setting menu

Press <OK> to switch from Spanish to English. Select the appropriate language and press <OK> to validate.



Figure 3.18 Language selection menu

The row '=>' scroll down to reach option 'Firmware Version' to check software versions currently running on the microprocessor (uC) and on the ports (FPGA).

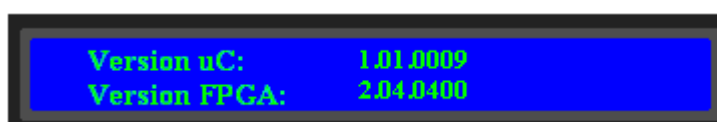


Figure 3.19 Version Firmware

This menu only allows checking of the software version. Any updates are carried out through the serial port 'CTRL', as discussed in the maintenance part.

'Nets default values' is the last sub-menu. It allows the user to restore the Net ports of the matrix to its original standard settings.

All Net ports are defined by some user parameters, making the ports work with an voice protocol by IP (VoIP) and creating a number of UDP sockets with programmed destinations. Kroma configures those parameters on the net server of each Net port.

The user should only alter the one parameter: the IP address of destination equipment. The other parameters should not be altered, as may cause the IP link not to work. Net port can be restored to standard values. The user should then configure the IP link again (as it will be discussed on the maintenance part).

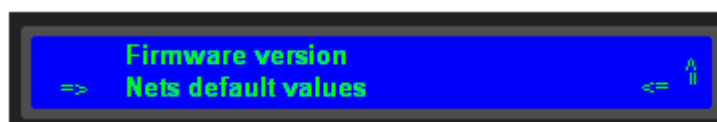


Figure 3.20 Net ports re-set

Should the above be done, **the Net port will cease working**. It will be then necessary to completely re-configure it again to connect to Ethernet. That option should not be used unless strictly needed. Otherwise, the IP protocol link will stop working.



Figure 3.21 Net port selection

Once the port is chosen, the system will ask if you are sure. Do select 'YES' will realize the port configuration and relapse to the standard non-operative parameters.

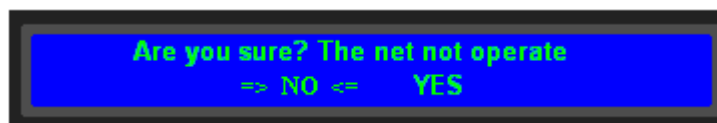


Figure 3.22 IP NET port

- (4) Reset

Press first <OK> following by <CANCEL> to access the last menu: 'Reset', once there, press <OK> to validate. It will start the equipment.



Figure 3.23 Reset menu

3.2 IP NET PORTS PARAMETERS

The NET ports must be rigorously defined as to clearly identify each link point.

Each net port has a local IP address (which identify the port on the net) and a remote IP address (e.g. from a beltback to a port) where data will be sent.

As standard, the IP ports on the matrix are pre-configured to be used on a sub-net, ranging from 192.168.7.1 to 192.168.7.254, with a mask: 255.255.255.0. The IP addresses could be modified through the software supplied on the CD, "Digi_Config_IP.exe".

NOTE: Be careful when changing an IP address. **If the address is already being used, the system will crash and the equipment will fail.**

To change the IP address, run the CD software in a PC connected to the same net, to which the net ports of the TM5012 matrix are linked (e.g. Ethernet switch).

Mouse double left-click on the "**Device_Discovery.exe**" file (\TM5012\Soft Utils\...). It should open a working-window: "Searching..." meaning: searching for the IP net ports of the matrix, as seen below.

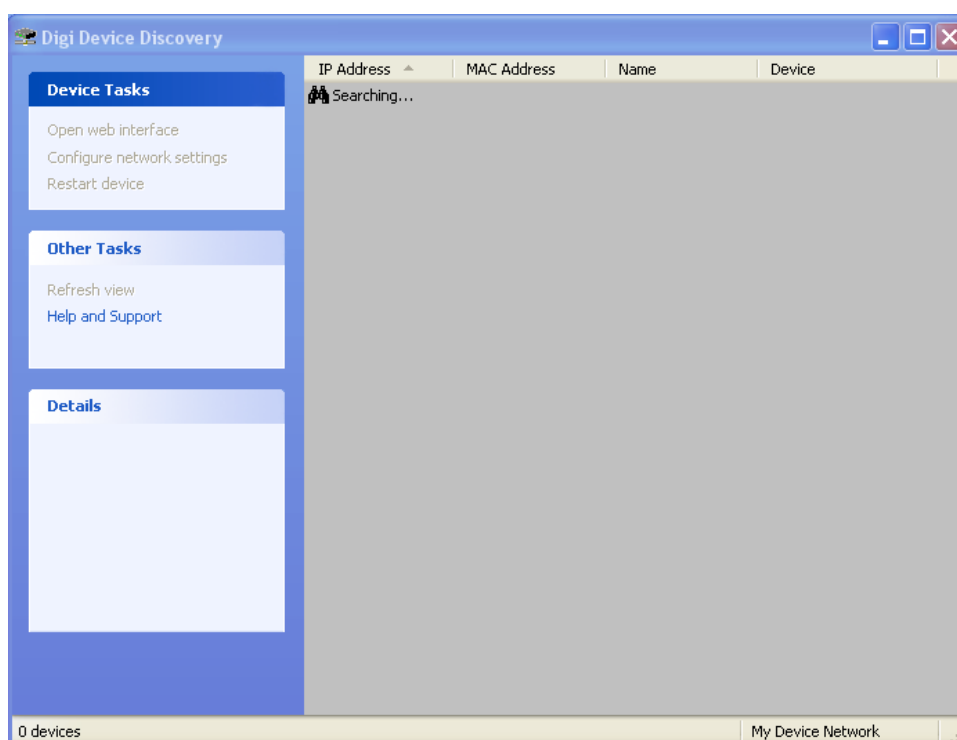


Figure 3.24 Monitor programme of net ports

As the software connects itself with the net ports, listings will show on the right window.

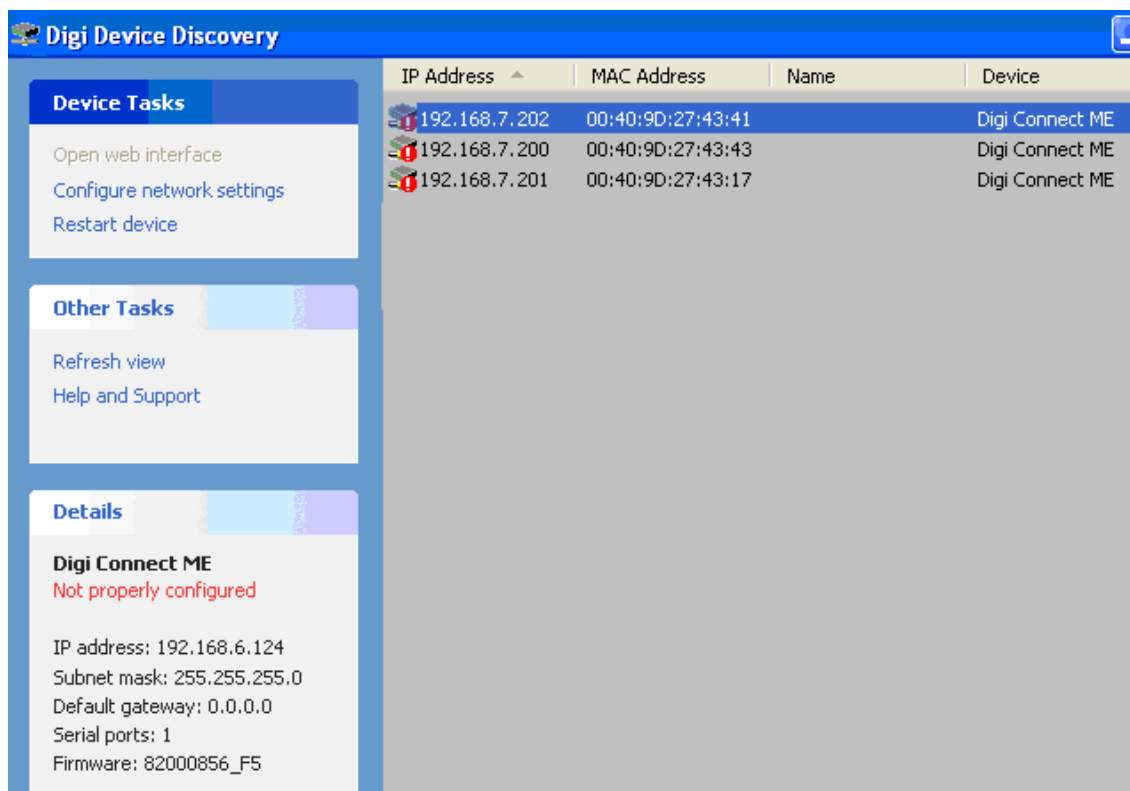


Figure 3.25 Screenshot of the Intercom devices on the net

NOTE: The software also will detect if any device from the WIFI TW7100 System or linker IP IL7004, is connected to the same local net.

The listing located on the right working-window, will show any detected equipment on the system, giving some info on them at the same time.

- **Device** -> Any detected equipment on the net. When it shows “Digi Connect ME” indicates that the device is either part of the hybrid matrix TM5012 or of the TW7100 base station. “Digi Connect Wi-ME” refers to a portable wireless (WIFI beltpack).
- **IP Address** -> IP address for each device on the net. As standard, ranks starts from 192.168.7.200 onwards.
- **MAC Address** -> MAC address of the device on the Ethernet net. Such address is fixed and cannot be modified by the user.

If no information is shown, check the qualities of the access to the net (such as firewall) and press “Refresh view” to refresh the screen.

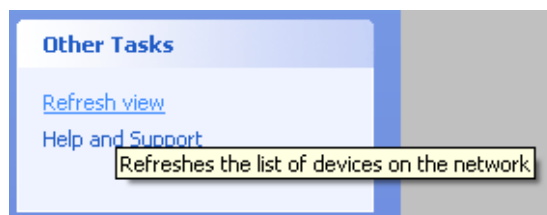


Figure 3.26 New search

To configure a new port's IP address, click on the device shown on the right window (it will show as shaded) and click on the "Configure network settings" option, see below.

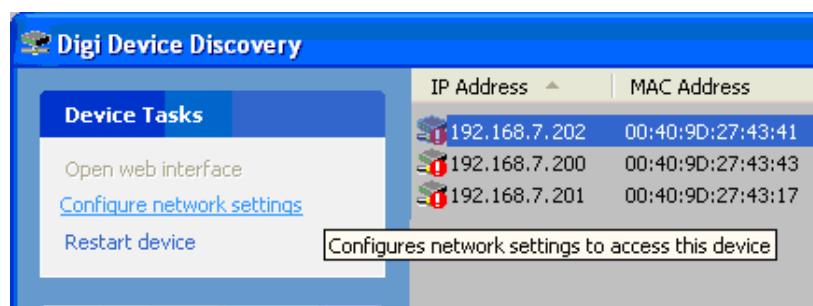


Figure 3.27 IP address configuration

After, it should come up an 'options window', where the actual IP address and its sub-net mask can be changed. It is possible to modify as well the gateway address to access an external net (WAN) or to the internet (e.g. ADSL).

To obtain automatically generated net parameters, the system should be connected to a shared network. DHCP server will provide those parameters. See below.

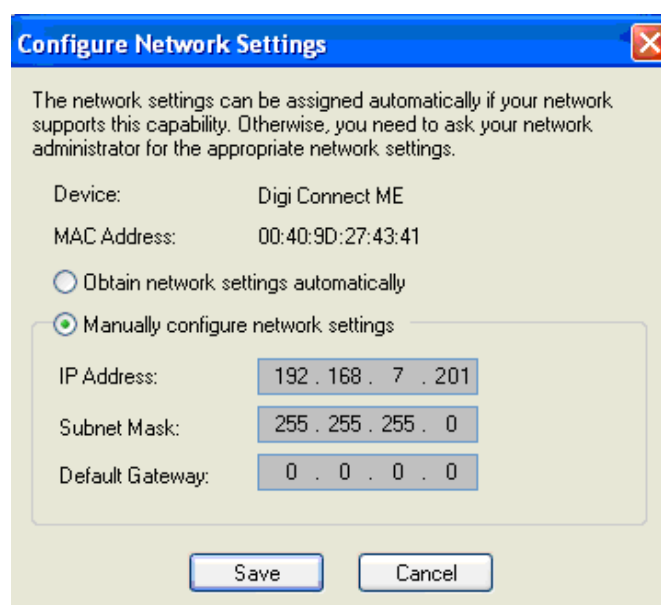


Figure 3.28 to change IP address

To change IP, do so on the 'IP Address:', and press the 'Save' button. The application will inform of the new reset address.

This method changes the origin IP address (source). To change the destination IP address port (where the port of origin is transferring data towards to establish the link, i.e. beltpack, or another net port of the Hybrid matrix) use a web navigator such as Explorer or Opera to access the port 'web server'. Type then, the address on the navigator, as below.



Figure 3.29 Web Server search

A welcoming window opens once the IP address is reached. It shows a message requesting Username and Password.

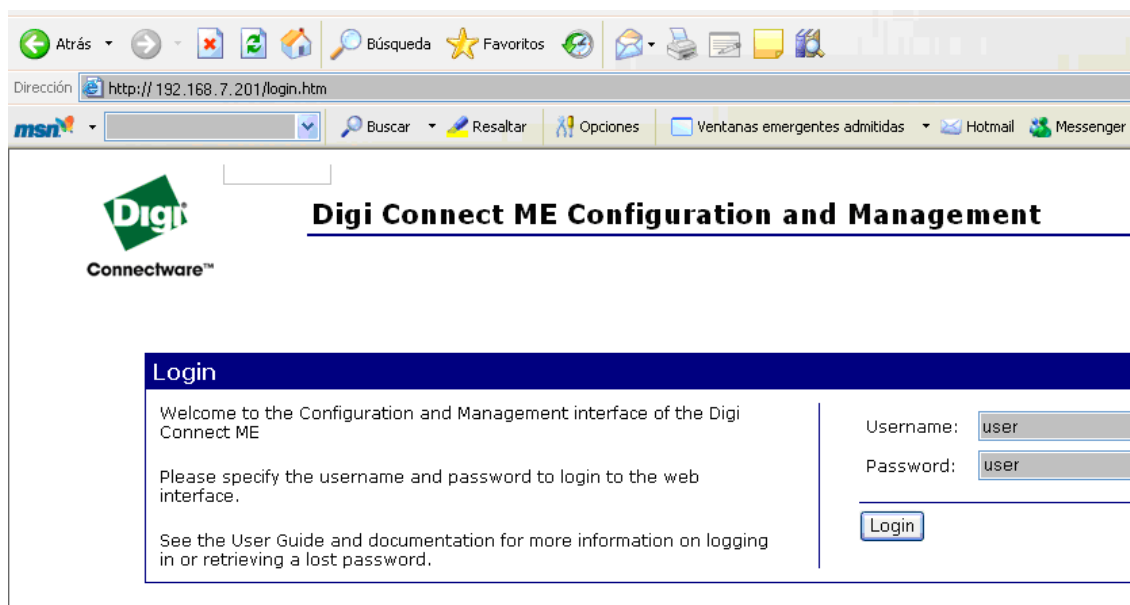


Figure 3.30 Web server access

As standard "Username: **user**" and "Password: **user**". Type it and click 'Login' to validate. It will show the available options on the net port, as below.

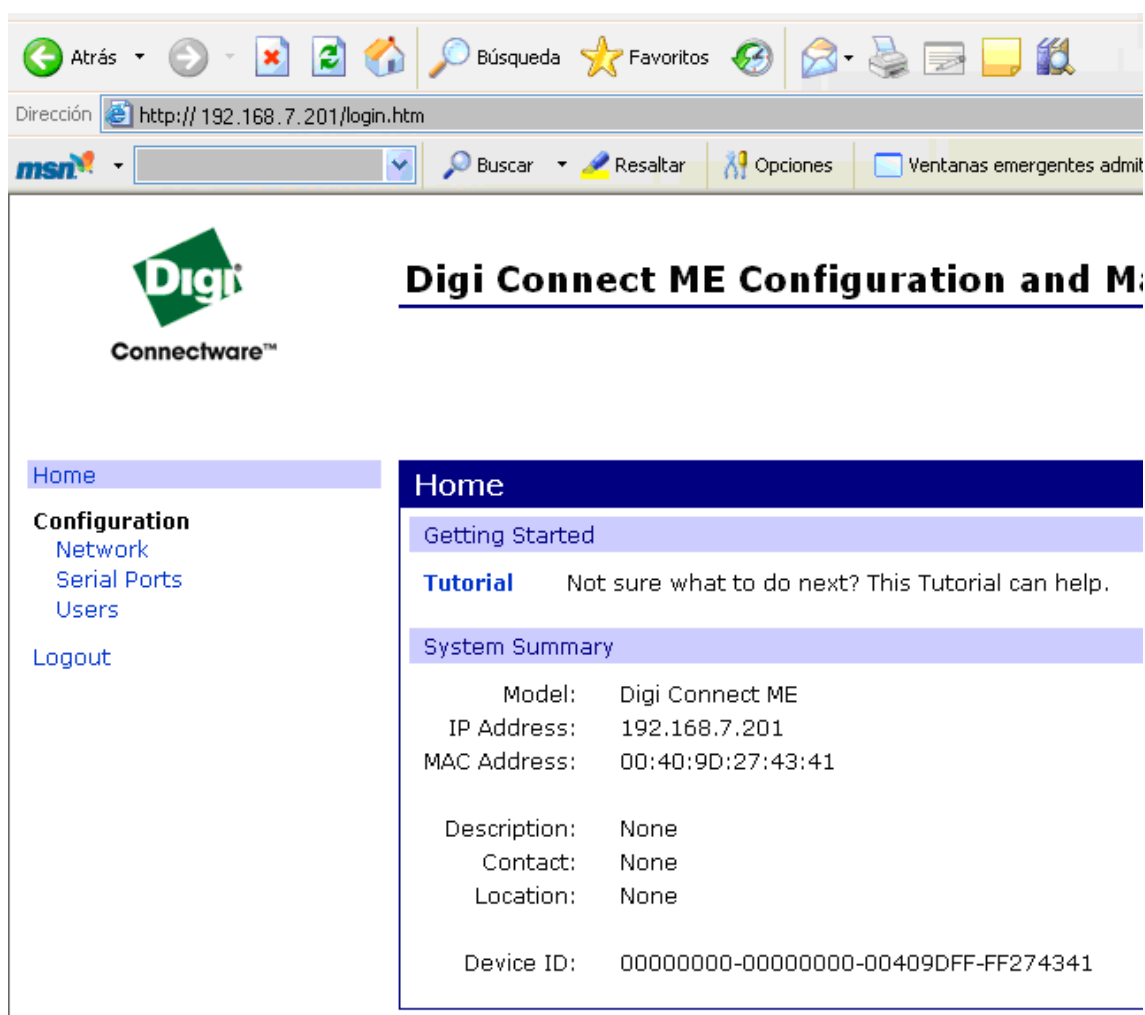


Figure 3.31 Destination IP net port configuration

The IP and MAC address will show among the qualities of the IP net port on the right window.

The MAC address is fixed and cannot be altered. However, the IP address could be changed here through the first option of the 'Network' configuration.

The screenshot shows a web browser window with the address bar displaying `http://192.168.7.201/config/network/network_config.htm`. The browser's address bar also shows the text "Dirección". The browser's toolbar includes a search bar with the text "Buscar", a "Resaltar" button, and a "Ventanas emergentes" button. The main content area features the Digi Connectware logo on the left and the title "Digi Connect ME Configuration and Management" on the right. Below the logo is a navigation menu with links for "Home", "Configuration", "Serial Ports", "Users", and "Logout". The "Configuration" link is highlighted. The main content area is titled "Network Configuration" and contains a section for "IP Settings". This section has two radio buttons: "Obtain an IP address automatically using DHCP *" (which is selected) and "Use the following IP address:". Below the radio buttons are three input fields: "IP Address:" with the value "192.168.7.201", "Subnet Mask:" with the value "255.255.255.0", and "Default Gateway:" with the value "0.0.0.0". Below these fields is a note: "* Changes to DHCP, IP address and Subnet Mask require a reboot of the device". At the bottom of the "IP Settings" section is an "Apply" button. Below the "Apply" button are two expandable sections: "Network Services Settings" and "Advanced Network Settings".

Figure 3.32 local IP net port configuration

Use the 'IP Address:' found on the right, to change the address. It has to be validated with the 'Apply' button. This is a second way of changing the local IP address, besides the way described above (using the supplied software).

In order to change the destination IP address, left-click the 'Serial Ports' option located on the left hand side.

It will appear an info-window on the right, reporting the UDP connection through the device's port number 1, as below:

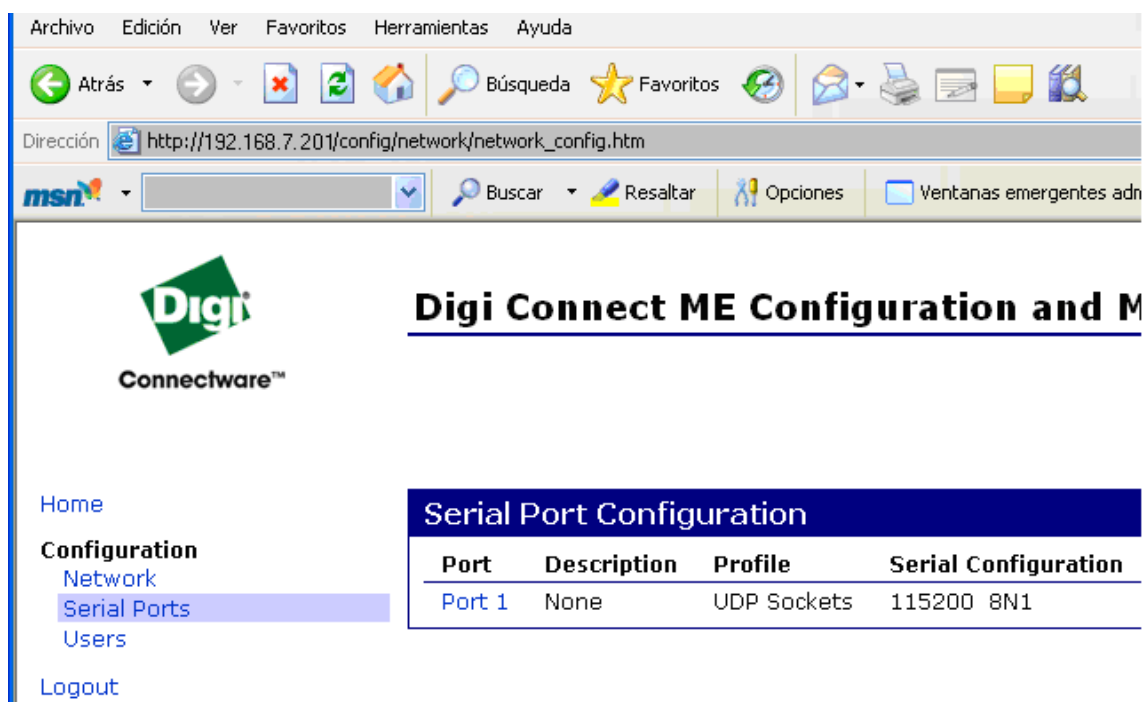


Figure 3.33 Configuration of net port

In order to modify the destination IP, left click on 'Port 1'; the parameters needed to be altered will appear on a port-configuration window.

There is a table comprising of:

- Description → As the name of the destination IP. It will be the name of the equipment to receive the audio data. This name is chosen by the user.
- Send to → As the destination IP address of the audio data. Each set of digits should be separated using dots: '.'.
- UDP Port → As the number of the software port used to establish communication between the intercom equipment. As default: '8087'.

NOTE: This port must be activated on TCP/IP gateways or routers located on the net (to allow transparent info traffic).

Type Description name, destination address, and the UDP Port and press the 'Add' button. This will make the net port send audio data to the destination IP address (it should correspond with an IP equipment of PRTP Kroma protocol).

There should only be one destination IP. In case of adding one more, remove the unnecessary ones and leave only the relevant ones.

The remaining options should be left as shown below:

Successfully removed UDP destination

Home

Configuration

Network

Serial Ports

Users

Logout

Serial Port Configuration

▼ Port Profile Settings

Current Port Profile: **UDP Sockets**
The UDP Sockets Profile allows a serial device to communicate using UDP.

UDP Client Settings

Automatically send serial data to one or more devices or systems on the network using UDP sockets.

☒ Automatically send serial data
Send data to the following network services:

Description	Send To	UDP Port	
PETACA_1	192.168.7.111	8087	Remove
	0.0.0.0	0	Add

Send data under any of the following conditions:

☒ Send when data is present on the serial line
Match string:

☒ Strip string before sending

☐ Send after following number of idle milliseconds
 ms

Send after the following number of bytes
 bytes

▶ Basic Serial Settings

Figure 3.34 IP address assignment

In the above example, there is a net port with a local IP address: 192.168.7.201, which it will send audio to a wireless WIFI with IP address: 192.168.7.111. Should the user need to send audio from the beltpack to that port of the matrix, use the WIFI beltpack's web server and do the pertinent changes and swap the local and remote address.

4 SOFTWARE

'Crossmapper' is the configuration programme for creating and editing cross-point maps. They are loaded into the matrix.

User declares size of the matrix. Equipments are assigned to each port and then commands to each panel key.

This software is provided in CD format. It is windows run.

4.1 INSTALLATION

Go to [\\Software\](#).. and then double 'click' in 'setup' for installing in the computer.

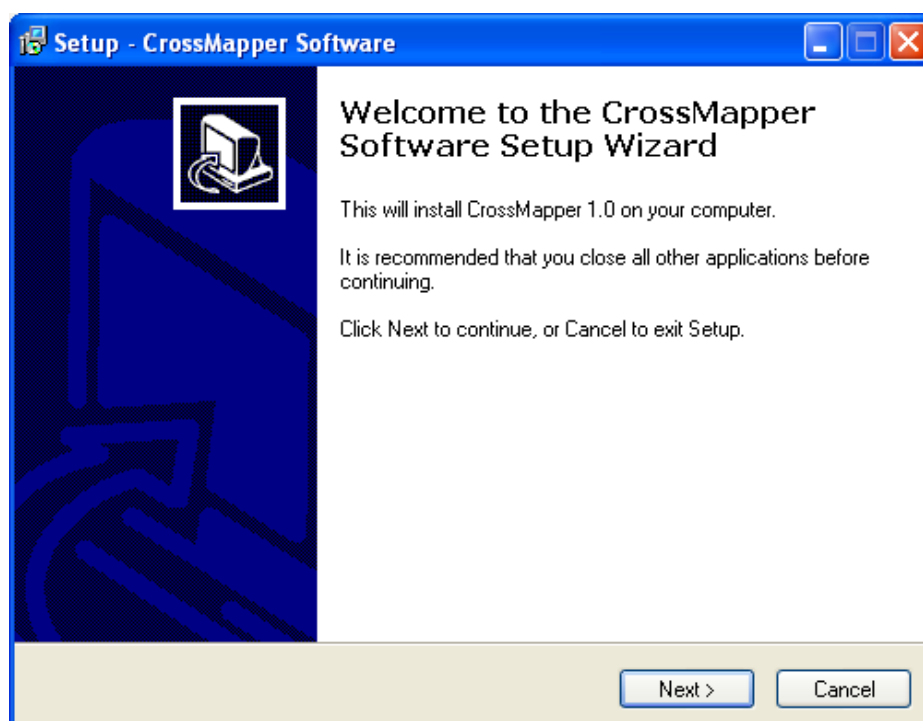


Figure 4.1 Crossmapper Installation

Click on "Next" and select directory to save the programme. "Program files" is selected by default.

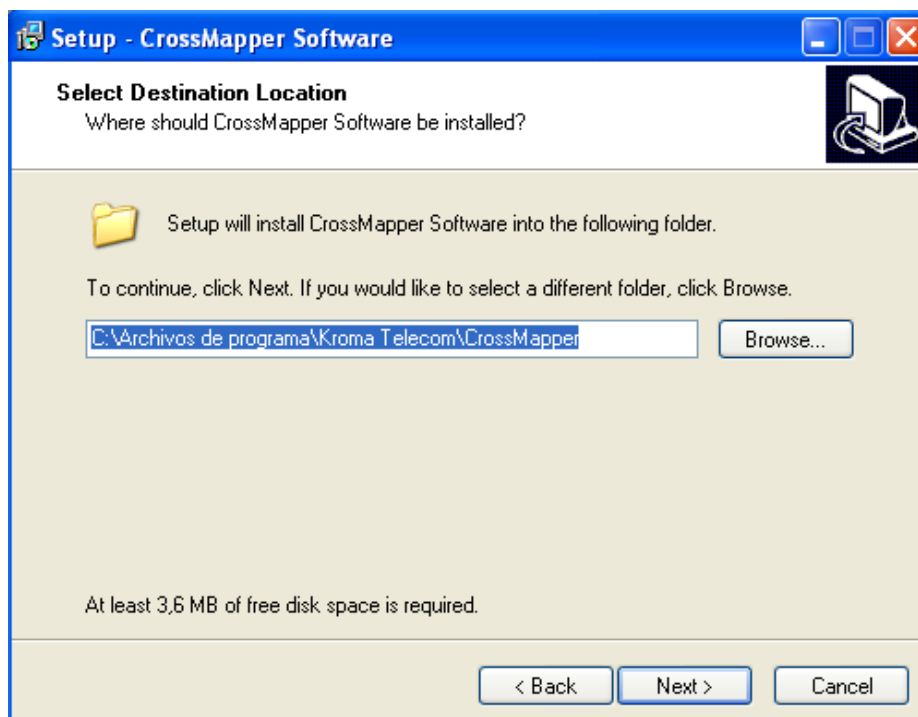


Figure 4.2 Directory

Next step is to name the directory. 'Kroma Telecom' by default.

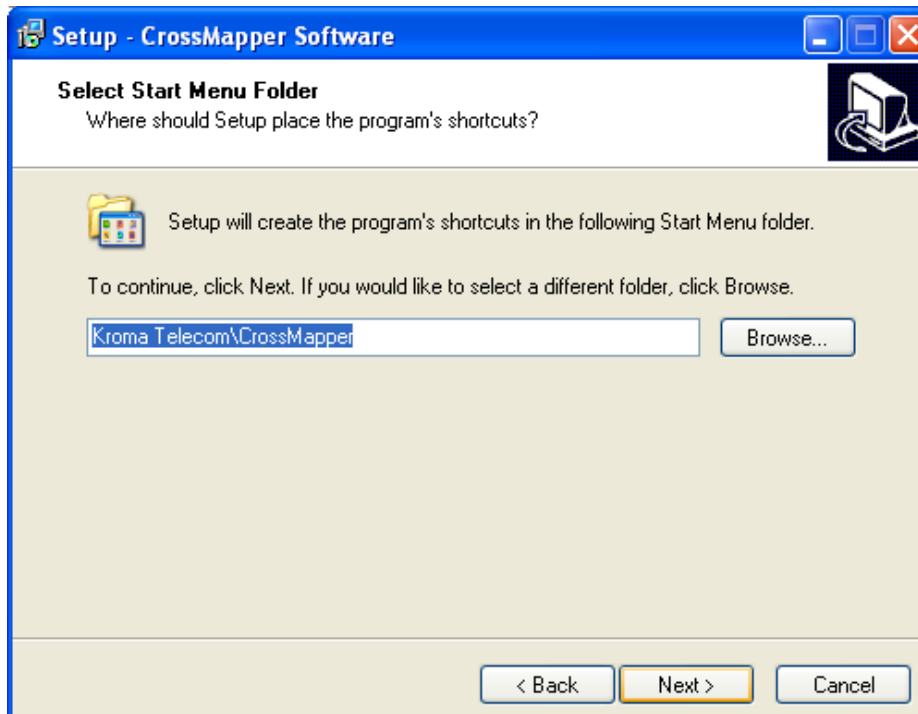


Figure 4.3 Name of the File

Click on 'Next' and create a desktop icon if needed.

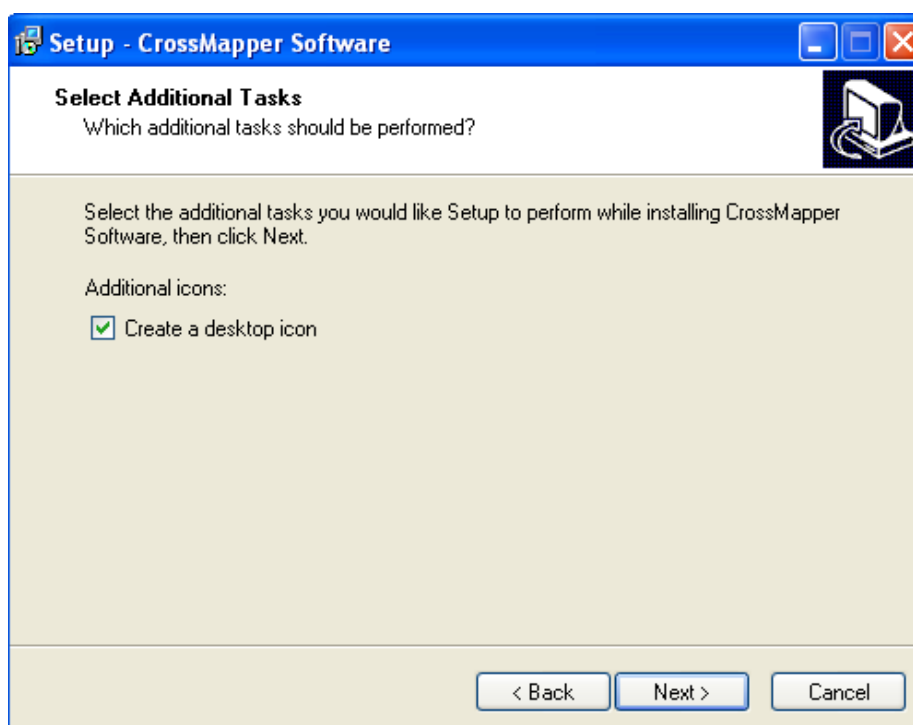


Figure 4.4 Create a desktop icon

Click on “Next” to have all installation information and then click on “Install”.

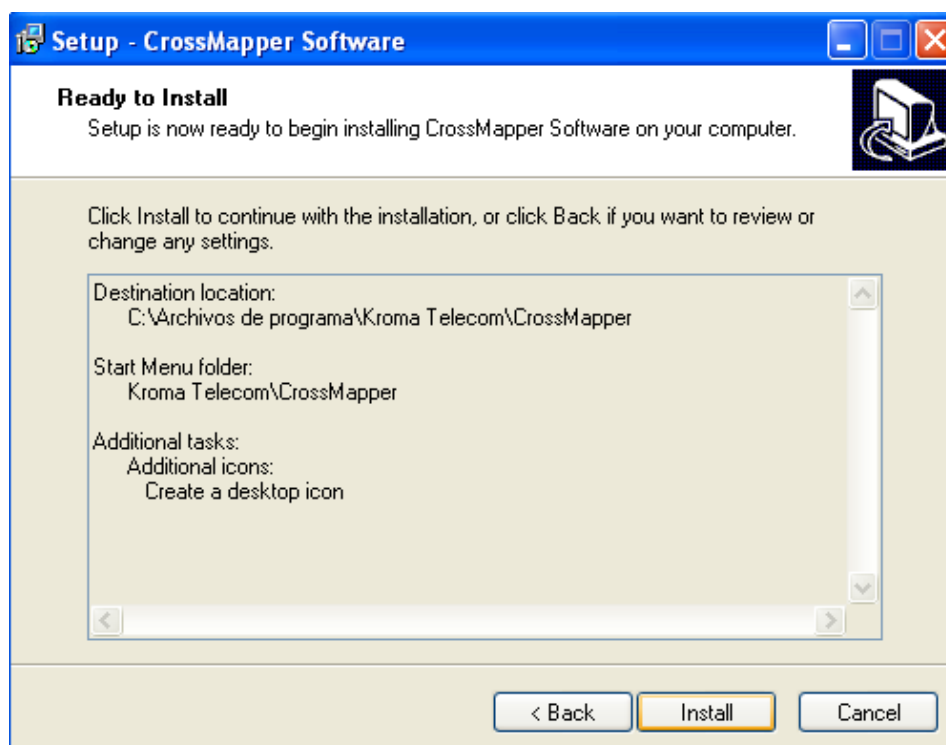


Figure 4.5 Installation report



Figure 4.6 Installation completed

Once files have been copied, installation is finished. User might execute the programme.

This software is opened by double-clicking on the desktop icon (it executes '*Crossmapper.exe*'). If others old versions had been installed in the same directory, the new version re-write the older.

If an online connection is needed, connect a port COM of the computer with the matrix through RS-232 (see installation chapter).

4.2 MENU OPTIONS

Once 'Crossmapper' is open, enter 'KROMA' password in capital letters. It can be modified or deactivated if necessary.

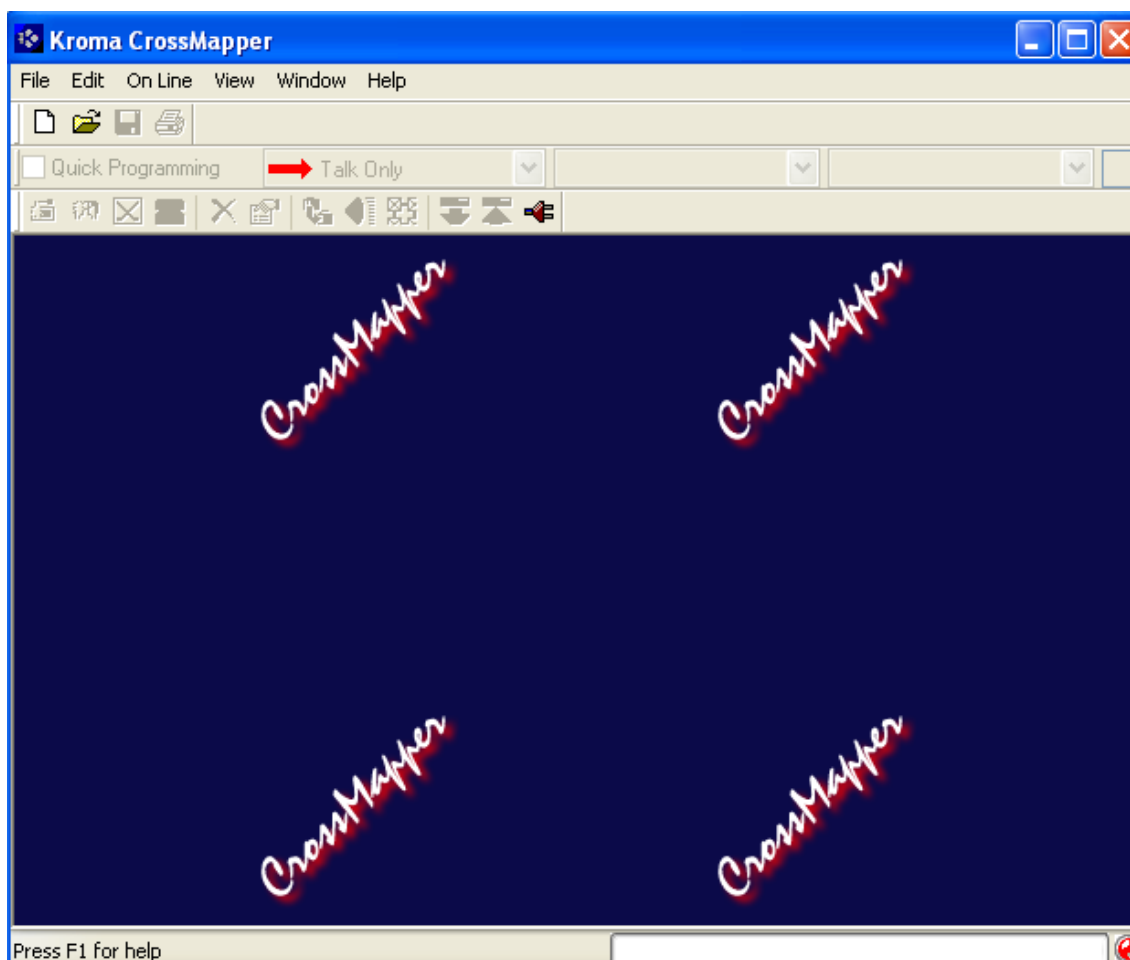


Figure 4.7 Initial screen

The first screen shows the options menus, direct access buttons and map information about the operative:

MENU → “ File ”.

For creating new maps, save them, editing, print configurations and labels, or changing password.

For password-modifying, select 'Options' and then 'Change Password' label. Enter current password, write the new one and confirm.

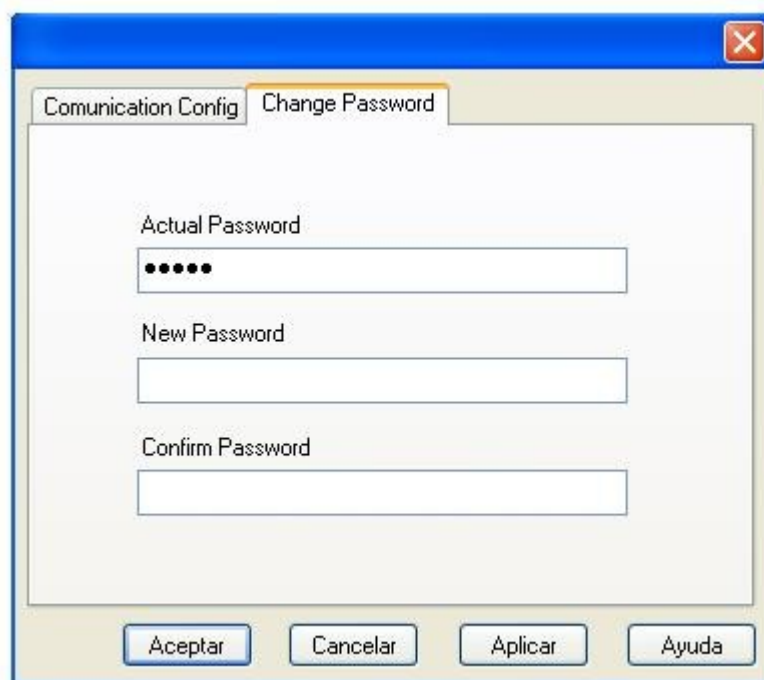


Figure 4.9 Modification of password

NOTE: *If new and confirm password options are filled in blank, no password is required the next time.*

MENU → “ Edit ”.

For establishing new ports, groups, IFB's (Interrupt FoldBack), telephone numbers for calling (only TB7000 system), properties and configuring audio levels by cross-point. Also copying configuration among identical panels and activating quick programming.

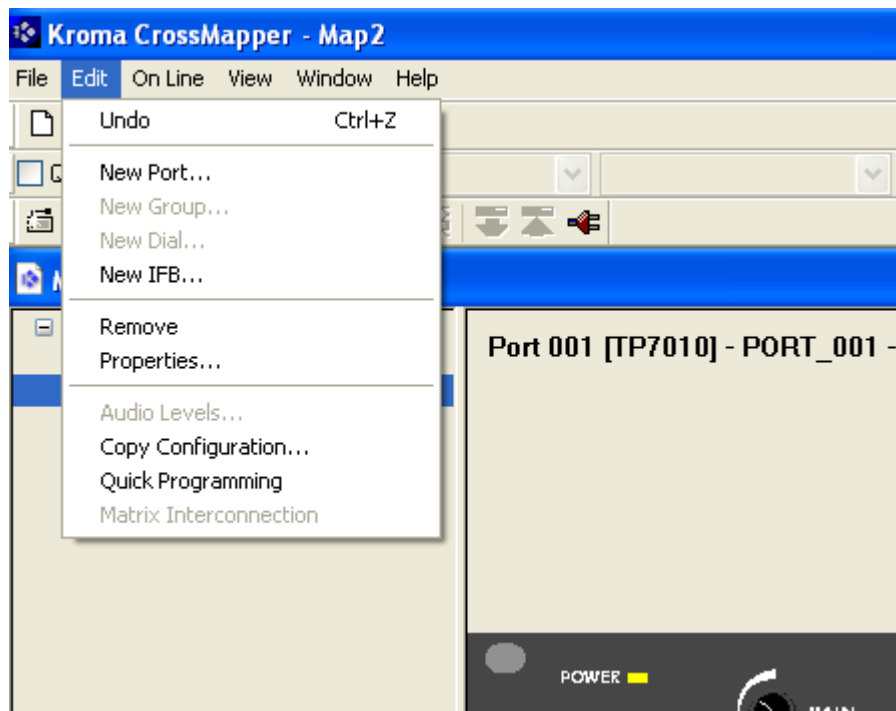


Figure 4.10 Edit menu

Options are as follows:

- Undo -> For going back to the previous action.
- New Port -> For creating new ports.
- New Group -> For creating new groups.
- New IFB -> For creating new IFBs.
- Remove -> For deleting ports at the config map (also the labels of this port at all panels).
- Properties -> For editing properties of any desired port.
- Audio Levels -> For making the audio levels in the cross-point from a source to target. This function is only operative in maps for Digital System TB7000.
- Copy Configuration -> For copying configuration among similar panels.
- Quick Programming -> For activating quick programming so commands are assigned quicker. This function is operative from the main window.
- Matrix Interconnection -> For importing maps of others digital intercom system for after the interconnection among them. This function is only operative in maps for Digital System TB7000.

MENU → “ On line ”.

This menu is used for connecting online to the control card for editing the maps, cross-points activation....

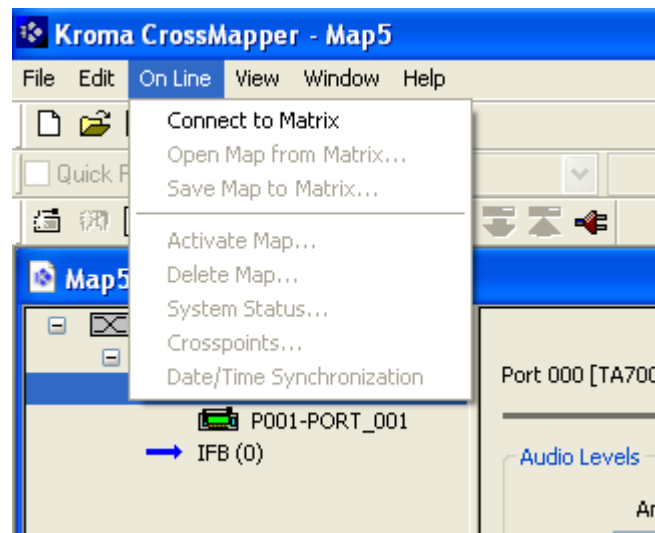


Figure 4.11 Online menu

Options available are:

- Connect to Matrix -> First thing to do. All other options need that the connection is activated.
- Open Map from Matrix -> For selecting any of the 8 available cross-point (only 4 in TM5012) maps in the system. It is transmitted to the computer to be edited.
- Save Map to Matrix -> Once edited, map is loaded in a bank of the matrix.
- Activate Map -> For activating any of the available maps. In this moment, the map is running by the system.
- Delete Map -> For deleting any of the available maps that already is not necessary.
- System Status -> For status monitoring the activated current map.
- Crosspoint -> For activating / de-activating cross-points. This option has top priority on any preconfigured command.
- Date/Time Synchronization -> For updating the time of master control to the computer time connected to system (only systems TB7000).

MENU → “ View ”.

For viewing the toolbars.

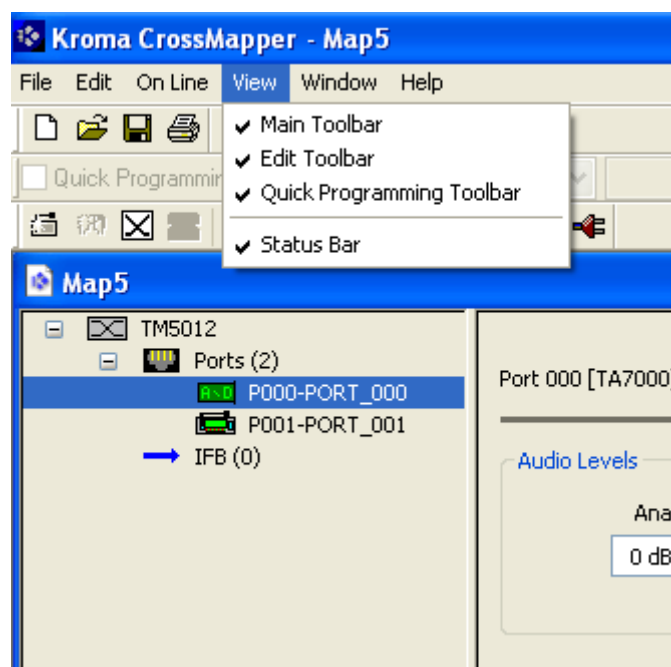


Figure 4.12 View toolbar menu

MENU → “ Window ”.

For modifying window of the document.

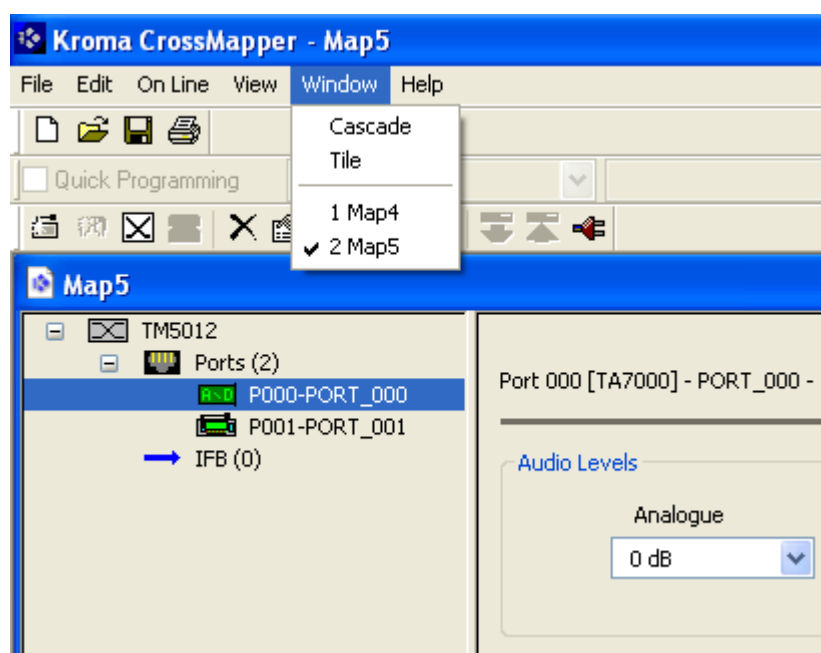


Figure 4.13 Window menu

MENU → “ Help ”.

In case any help is needed. Several subjects are displayed. In this menu also is available the software version of the application.

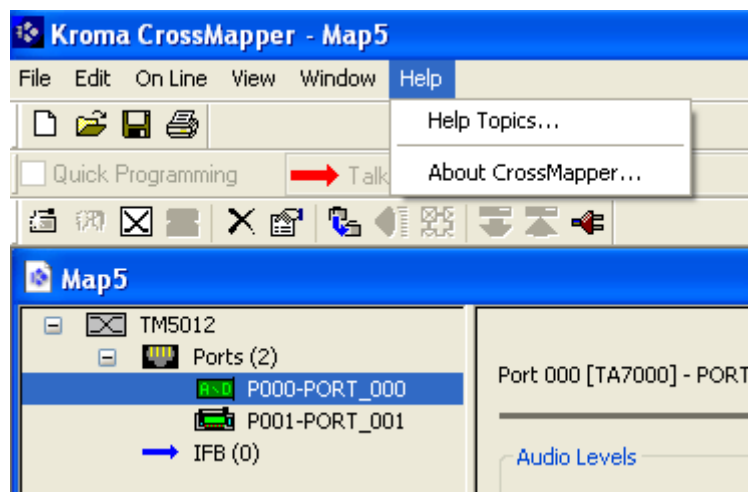


Figure 4.14 Help menu

Also, there are icons that allow a quicker access to the same functions than the menus. One is the toolbar for opening, saving... files:

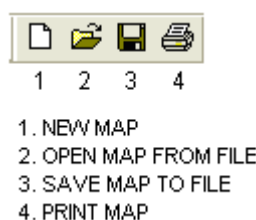


Figure 4.15 File icons

Another is the one for map creating....:

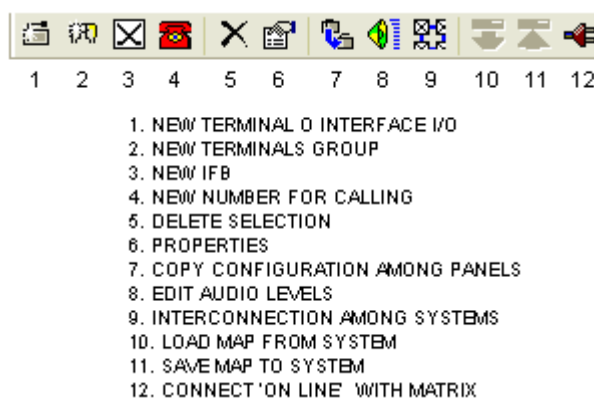


Figure 4.16 Map icons

The last toolbar is for quick programming (just command, origin and destination, assigned label). Then click on the desired key of the panel. Note that this option must be activated (the square at the left must be stick in).



Figure 4.17 Quick programming

Quick programming can be done only at the panel selected at the left window. If quick programming must be done at another panel, this option needs to be deactivated first of all. Then, select the panel at the left column and activate quick programming again.

4.3 PORTS CONFIGURATION

For creating new maps, go to 'File->New' or click on:



New map

This configuration software allows operate with some intercom system. The user must be selected the type of system in use:

- TB7000 → Digital Intercom System, consist of one unit Master control and several units of cross-point matrixes.
- TB6500 → Analogue Intercom System, consist of one unit matrix with all control and cross-point.
- TB5000 → Hybrid Intercom System, consist of one unit matrix with all control and cross-point.

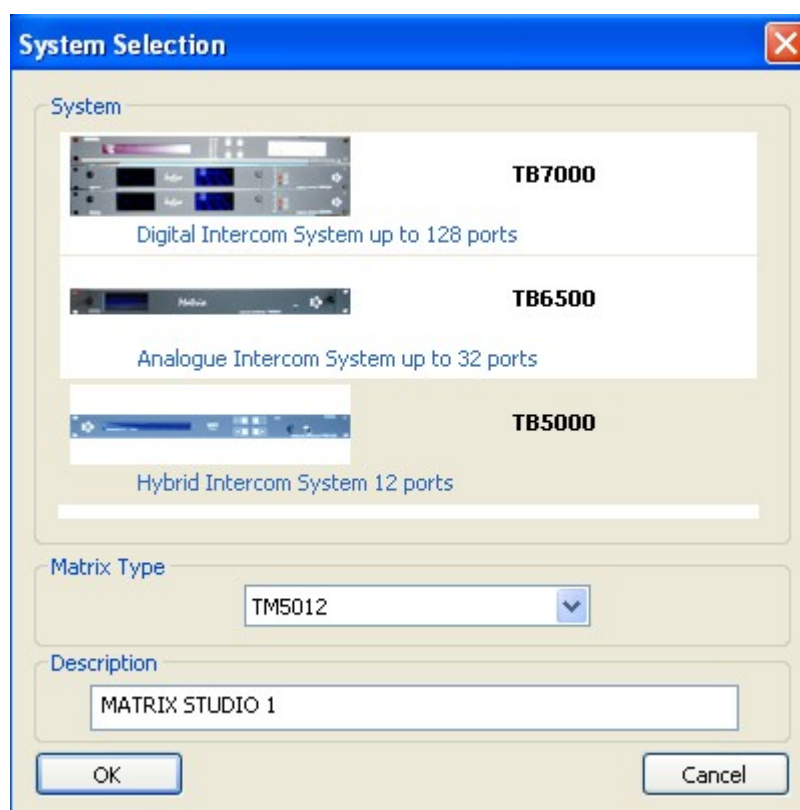


Figure 4.18 Type of system to select

Once the system is selected, the next step will be to choose the type of matrix (cross-points total number).

The new map is generated when the system TB6500 has been selected and the menu of matrix type is chosen the matrix about the number ports.

For 8x8 matrixes, select TM6508. For 16x16 matrixes, TM6516 and 32x32 matrixes, select TM6532. For a proper operation, do not assign one matrix to a different model. A description can be add how a comment explanatory.

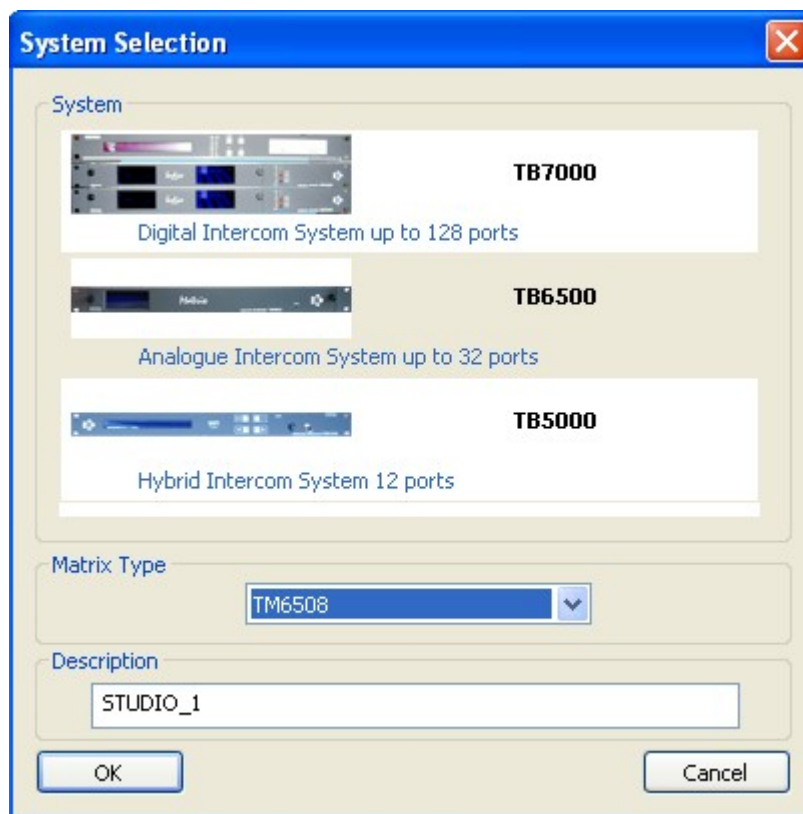


Figure 4.19 Type of matrix to select

The button 'OK' must be pressed and a new window is displayed. With this new map is necessary to assign in each port of the matrix, the type of terminal (panel or interface I/O).

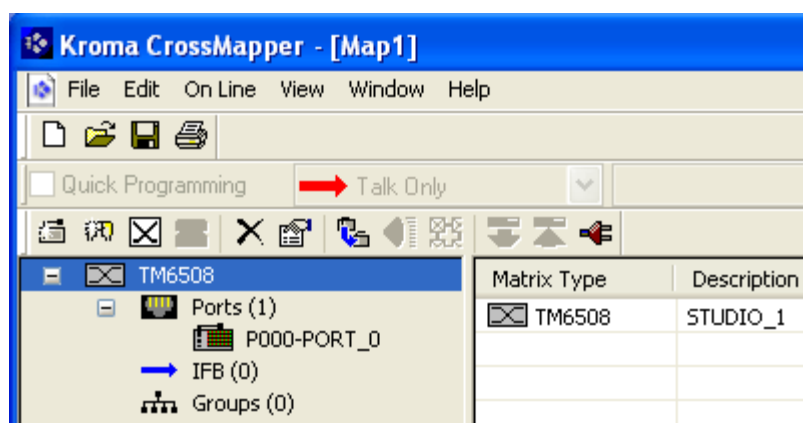


Figure 4.20 New configuration map

The left window display the map for editing and the characteristics of the structure such as the attributes of the ports. If the ports are opened then this attributes are display in the right window.

NOTE: In the hybrid matrix *TM5012*, the work groups and call numbers can not be programmed.

The features of the ports are this connection number to matrix, the logic name used to identification in keys (mnemonic) and the type of terminal (panel or interface).

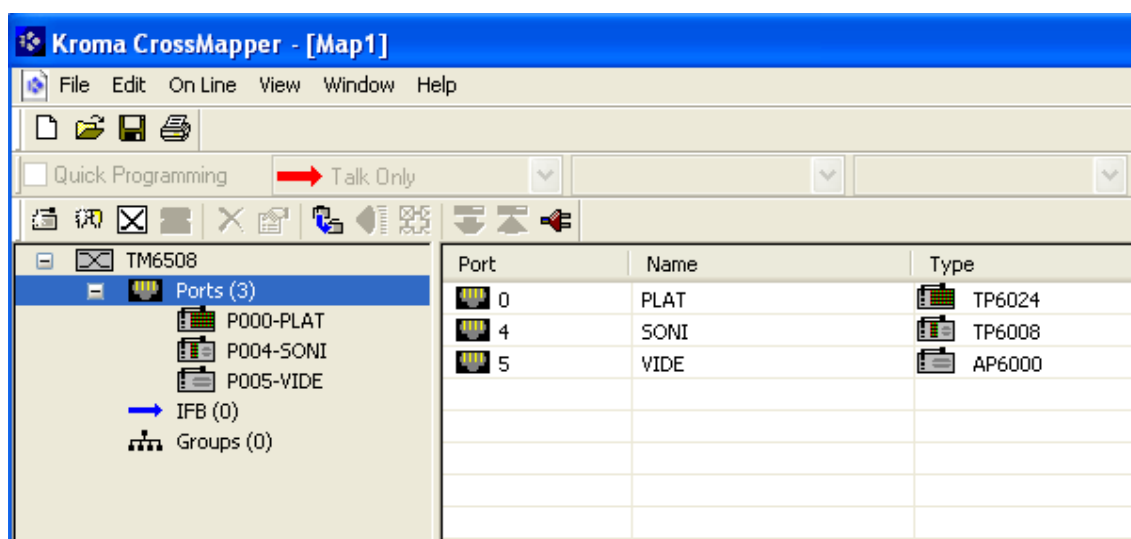


Figure 4.21 List of ports

For creating a new terminal, go to 'Edit->New Port' or click on:



For deleting a terminal, go to 'Edit->Remove' or click on:



To each element added, you have to assign the descriptive name (mnemonic). This name can be up to 10 characters but only four characters are displaying in the panels with dynamic labels of the type to similar TP7010.

Depends on functionality of panels, there are several terminals available for the ports of matrix:

- **Digital panels** → The digital panels of the serial TB7000 can be connected too WiFi wireless beltpacks with your base station TW7100.
- **Analogue panels** → The analogue panels of the serial TB6000 can be connected, also wire beltpacks BP6000.

- **Interfaces ports I/O** → There are several types of audio interfaces for the matrix ports (GPIO, telephone,...only for TB7000). These one ports of audio operates to 4 wires and can be used for interconnecting to other audio system.

In all ports may be select the terminal model to connect among the list. Each user must to identify the equipment to connect in this port. So, the user must to assign a descriptive name.

If you push at the top in the window ('Panels' label), the panels are showed compatible with the port selected. In the lower part 'I/O Ports' appears the audio interfaces.

NOTE: It is obligatory to make in the configuration that the type of physical terminal connected in a port must be same to assign in the map by software.

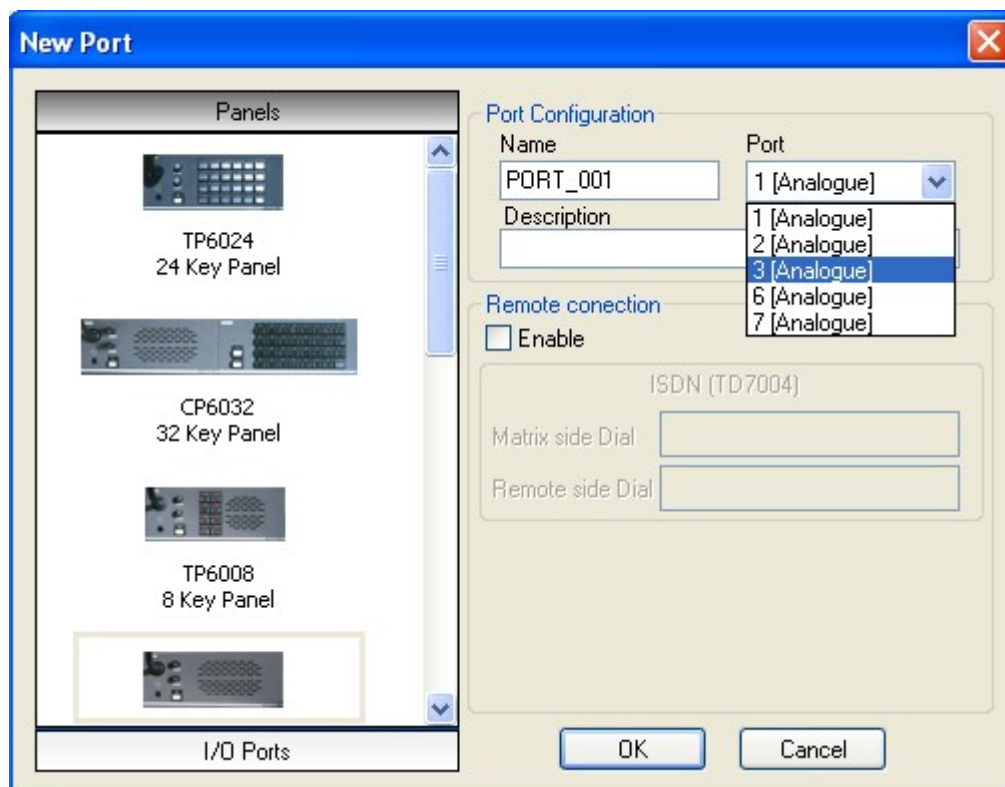


Figure 4.22 New port

The types of interfaces I/O are:

- BP6000 → Wired analogue beltpack.
- HN6000 → Telephone interface.
- CE6000 → Concentrator of audio.
- EL6000 → Interface for 4 wire signals.
- EL6001 → Interface for 2 wire signals.

Also there is a generic audio for interconnection to other matrix.

That interface must be assigned to the port where is physically connected. It is also important to state a 4-character mnemonic that will be used afterwards for editing the cross-points.

Note that these interfaces cannot be configured as no data is transmitted (audio only). These just adapt external audio sources into the intercom matrix

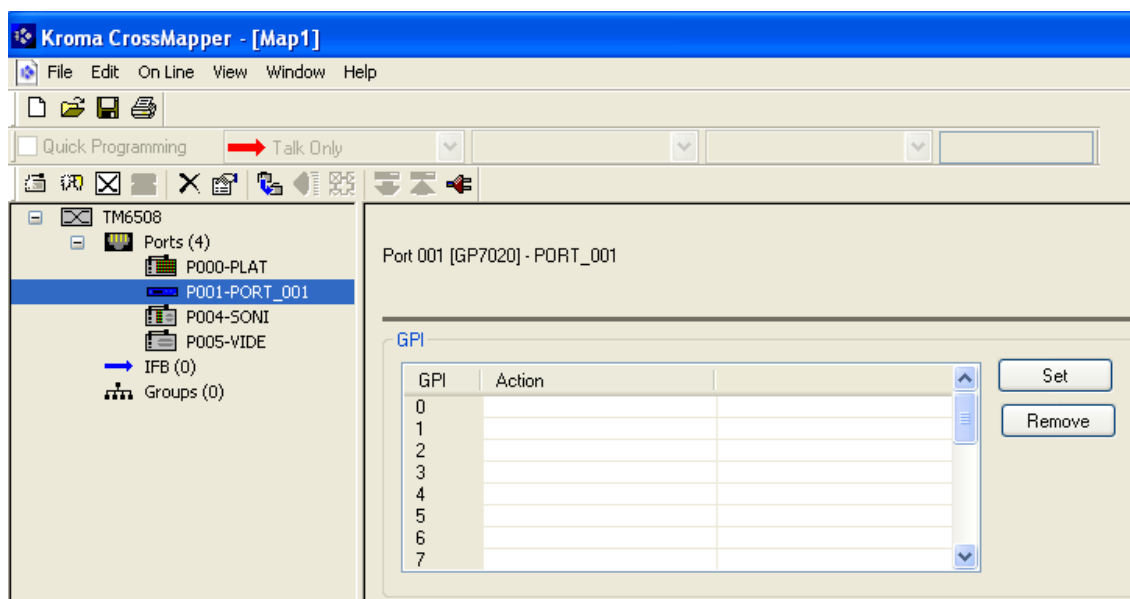


Figure 4.23 List ports

4.4 IFBS CONFIGURATION

The IFB's (Interrupted Foldbacks) are cross-points (from source to target) that are temporarily interrupted by other cross-points. They can be direct and inverse:

Direct IFB's → There is IFB cross-point between a source (input) and a target (output). When a new call input in the same target, the IFB cross-points are interrupted (i.e. the inputs assigned with direct IFB are cutting to output of temporal way. If the input communication is finished, the IFB cross-point to this target are recovered again.

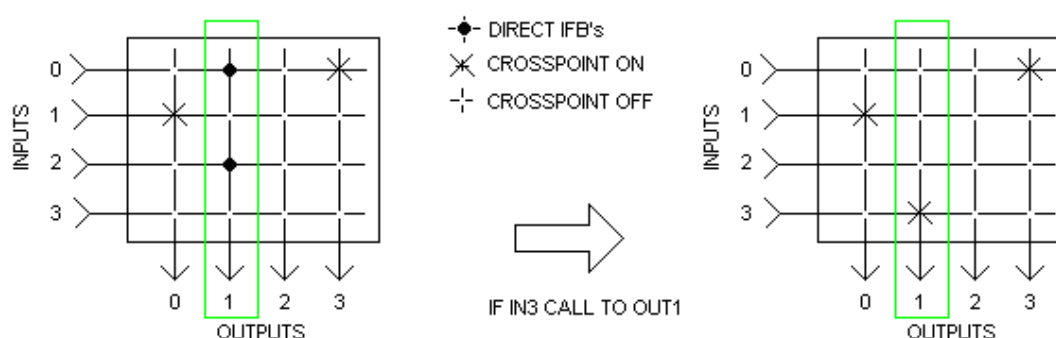


Figure 4.24 Direct IFB

Above example: At the left diagram, output 1 receives two audio signals (inputs 0 and 2, assigned with direct IFB). Whenever we assign a direct IFB, we are allowing that the cross-point is interrupted by a more important source. At the right diagram, input 3 interrupts input 0 and 1 to output 1.

For example: presenters that hear programme return signal all the time, which is interrupted by director comments. Assigned input towards that destination is temporarily interrupted by a third party.

Inverse IFB's → IFBs between an source and a target that are interrupted when a call is answered by any assigned destination (the output inverse IFB cross-point is temporally cut with this input but not the output that captured the call). When one of them replies, it prevents all the rest destinations from talking to origin. If the communication is finished, the input IFB cross-points to outputs are recovered again.

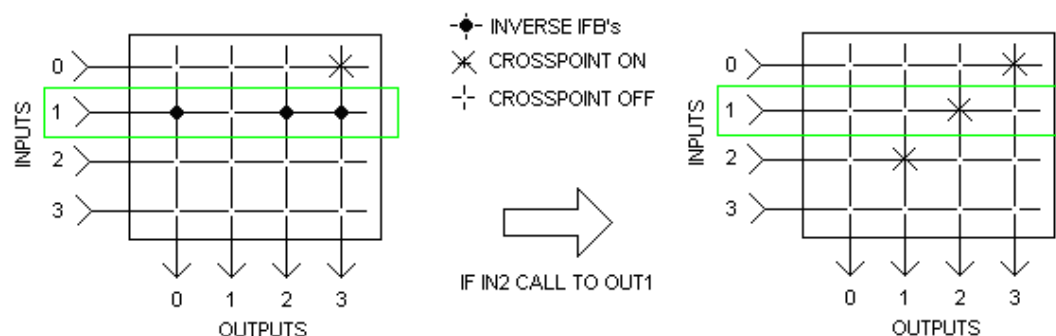


Figure 4.25 Inverse IFBs

The example before shows several inverse IFBs assigned between one input (1) and several outputs (0, 2 and 3). When input 2 wants to talk to output 1, the outputs 0 and 3 are interrupted: only the input 1 listens to the output 2.

A new IFB can be added through 'Edit->New IFB'. Or click on icon:

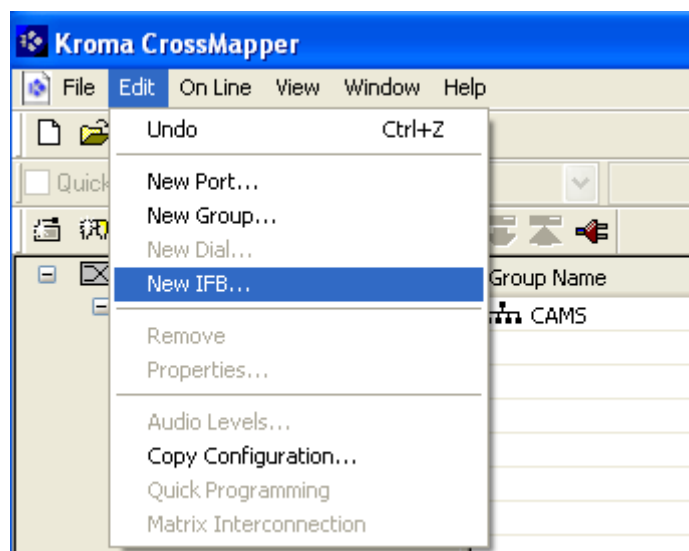


Figure 4.26 New IFB

The next window displays the action to programme between a source port and a target port:

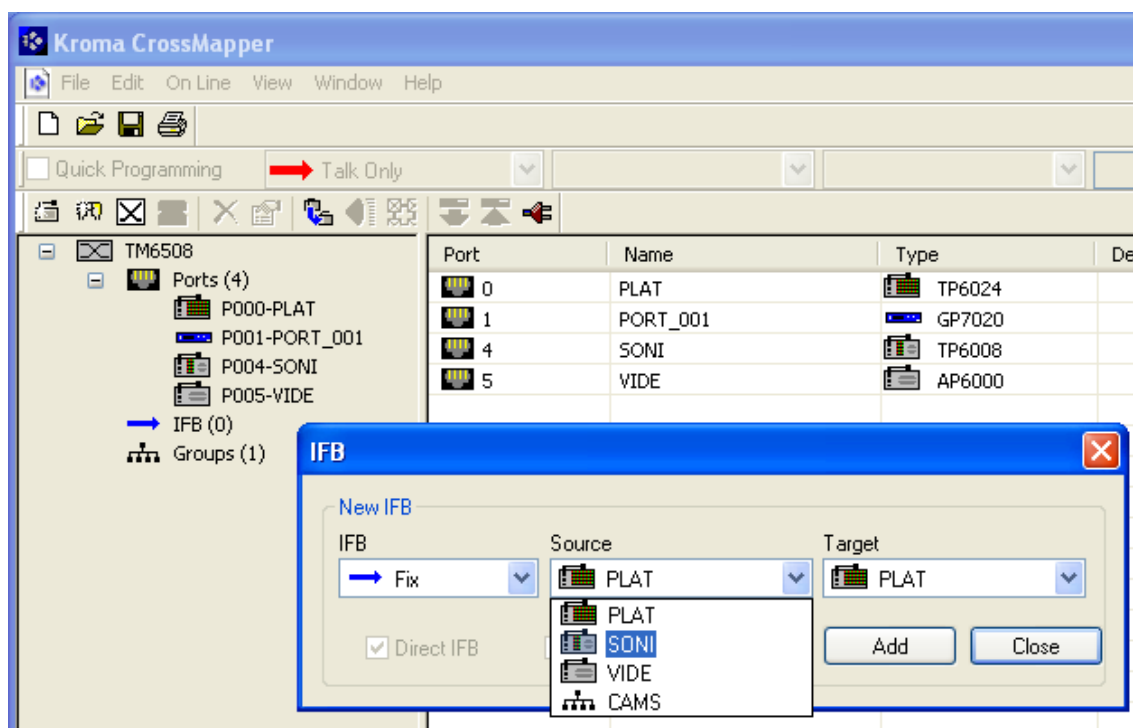


Figure 4.27 IFB creation

Each IFB can be direct or inverse except for Fix and Clear IFBs that are permanent or cleared. The different types of IFB's are:

- **Fix** → Cross-points that remains always active between a source and a target. They can not be interrupted. For example, an external audio source that is always listened at certain panel without pressing any key.
- **Cut** → A cross-point is temporarily interrupted by a third party. They are called '**Standby**' as well, because the inputs are temporally cut to one output. Inverse IFBs of this type are also called 'Inverse Standby' because of the outputs are temporally cut in a same input.
- **Clear** → Prohibited cross-points. One source is not allows to establish a communication with a target.

NOTE: The hybrid intercom matrix TM5012 only allow to make IFB's of type fix or cut.

Up to 64 IFBs can be defined in the system.

For deleting any IFB, select it at the left column and then click on the IFB to be eliminated. Then go to '*Edit->Remove*' or click on:

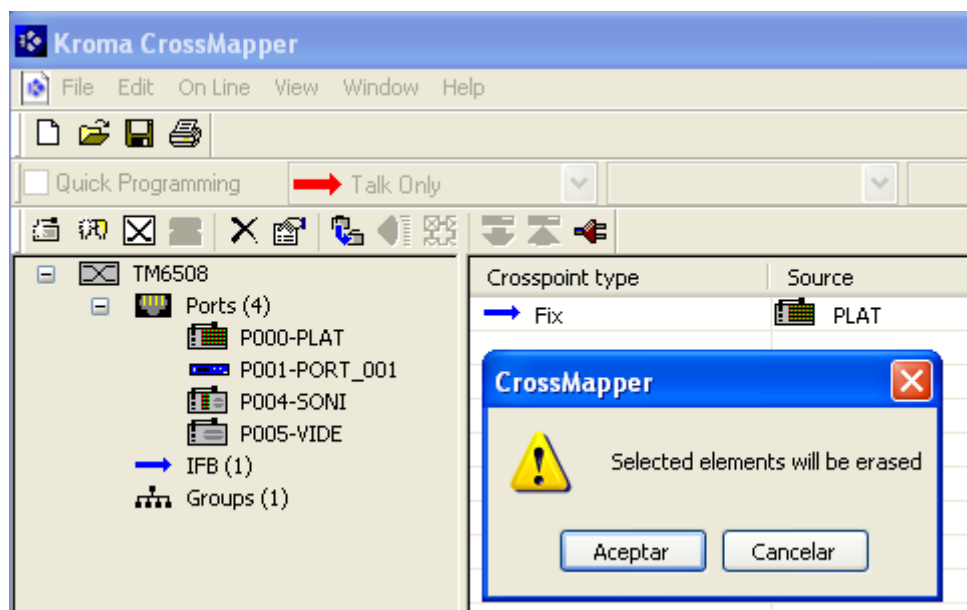


Figure 4.28 Removing an IFB

4.5 KEYS CONFIGURATION

Once a map has been created and all ports have been stated with terminals and interfaces, user must configure each key with its command. Two ways:

- **Standard Mode** → When panel is selected, double-click on each key. Then fill the data requested with this attributes.
- **Quick Mode** → From the main window, commands are assigned. When no special properties are needed.

The normal way requires that user selects on the left column the panel to configure. Click on each key to assign a command:

NOTE: The systems TB6500 and TM5012 is not available the volume properties of cross-points, only in the systems TB7000.

First, the panel must be select among all the ports displays in the left window. Then, this panel appears in the right side with the keys in the front.

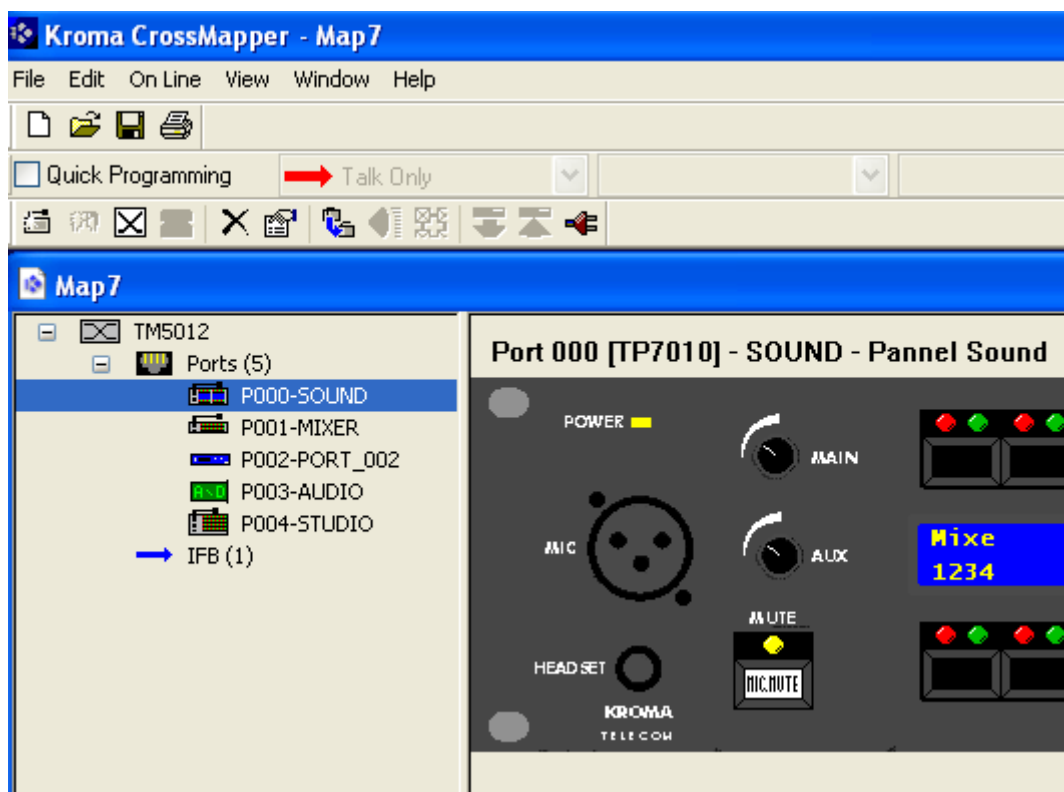


Figure 4.29 Keys are assigned

If the cursor is moved up to the key to form, then double 'click' above the key so a new window appears.

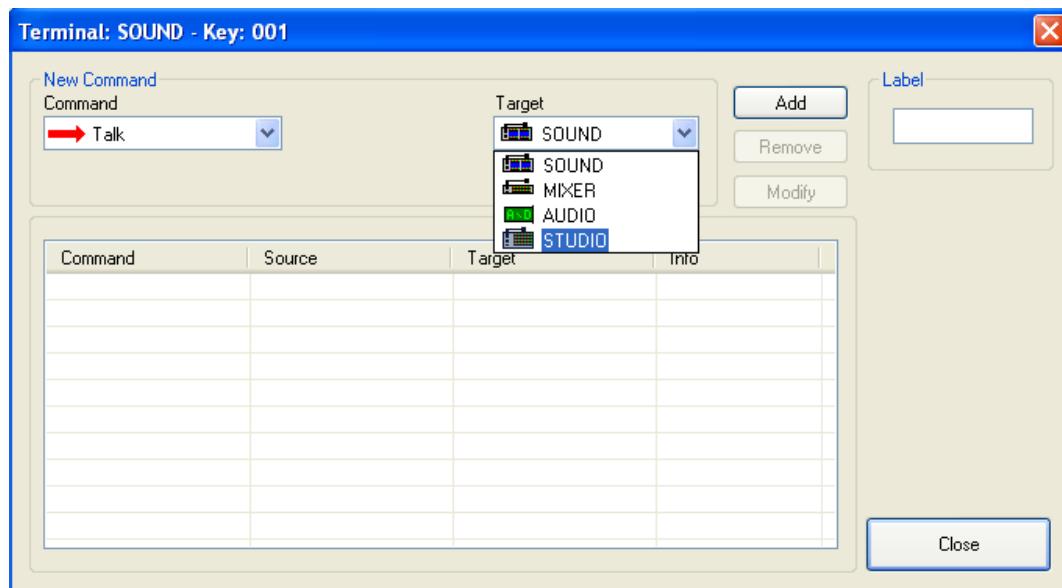


Figure 4.30 Commands are assigned to keys

The options are:

- **Command** → Action to be done when user presses that key. Up to 128 commands can be assigned to a key. Note that leds will indicate the first to be done. Cross-point keys can have the following commands:
 - Talk Only → Audio goes out of the panel to the desired target (one way).
 - Listen Only → Audio enters the panel from other source (one way).
 - Talk & Listen → A keystroke opens the communication in both ways.
 - Remote One Way → It creates a cross-point between a source and a target. The audio out from source to target (one way). It is a remote function between two points, by switching the key of the third element different.
 - Remote Both Ways → It creates a cross-point between a source and a target. The audio out from source to target and vice versa way. It is a remote function between two points, by switching the key of the third element different.
 - Mic/Headset → It selects the extern headset or the local kit microphone-speaker. This option is only possible in digital systems TB7000.
 - GP OUT → General Purpose Out for switching contact catch. With this command, the Tally Out of the panel may be closed and opened.
- **Source** → Origin of call.
- **Target** → Destination of call.

- **Label** → Brief description of the command. It can be automatically filled and it is showed the user in the assigned key.

The nomenclature used to the cross-points is:

- Talk & Listen -> Capital letters.
- Talk -> Only first letter in capital.
- Listen -> Small letters.

In the panels that not available dynamic labels by displays, is used other more nomenclature 'symbolic' for helping the user in the command:



Figure 4.31 Symbols Nomenclature

Once assigned, activate with "Add" button. Then 'Close'. Repeat per each key.

Now, there is a second method of operation more quickly for programming.

For quick programming, select the panel to programme and go to 'Edit->Quick Programming'. Or click on:

☒ Quick Programming

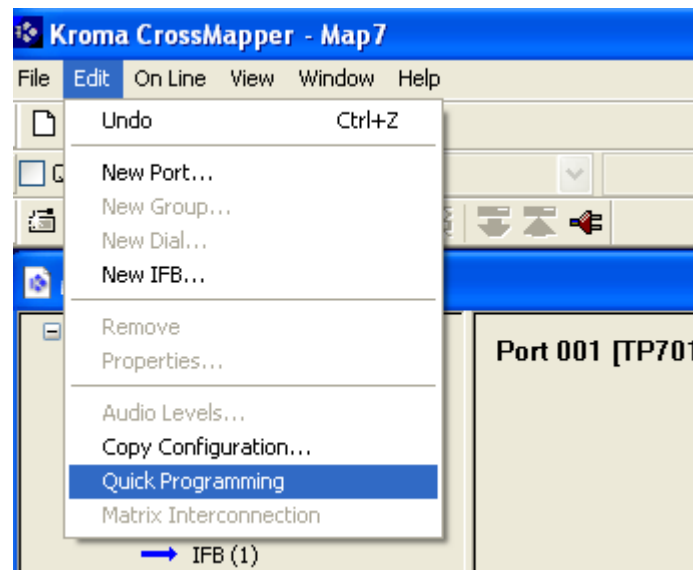


Figure 4.32 Quick programming activation

This programming take like origin the panel selected before than selected, then before the desired panel must be selected and after go to menu 'Quick Programming'

Quick programming toolbar will be activated so user can begin. Choose command, destination and label for the key. Then click on the desired key. Cross-point assignment is done. Origin cannot be changed unless another panel is chosen.

Other more function available is the copy of the keys panel programmed to other panel **whenever this panel destiny is identical type**.

For copying configuration of any panel to another one, both terminals must be of the same type. Before selecting origin and destination panels, click on:



NOTE: *If you want to move the commands of a key to other key, you can select the origin key with the left button of the mouse and then you move this key up to the destiny key, and after release the button. In this moment, the new key takes this configuration.*

4.6 ON LINE CONNECTION

The configuration software can be connected to matrix through RS-232 serial protocol for operating with the maps has been create and monitoring of status system.

Any of the 8 available maps on the ROM memory can be handled for loading, activating, erasing...

The COM port in the PC must be configured. No need to change frequency as it is automatically done (unless that port is already being used). Go to 'File->Options' and choose COM used to connection:

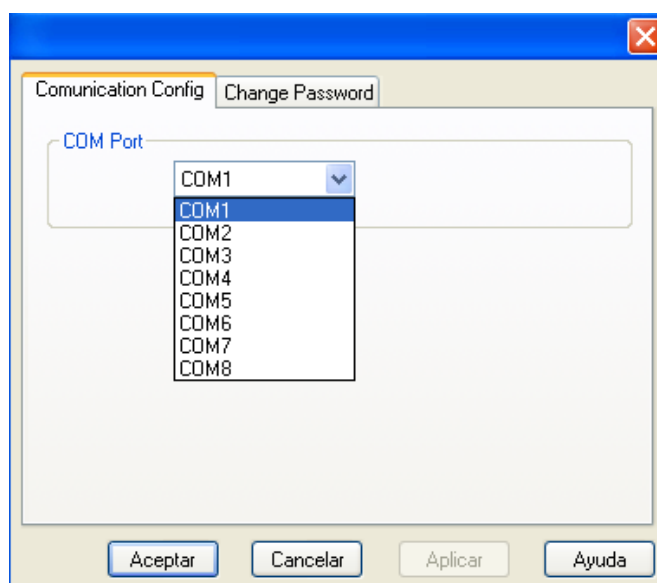


Figure 4.33 Serial port to use

Once configured (your must be sure that the cable between PC and matrix is connected), go to 'On line->Connect to Matrix' or click on:

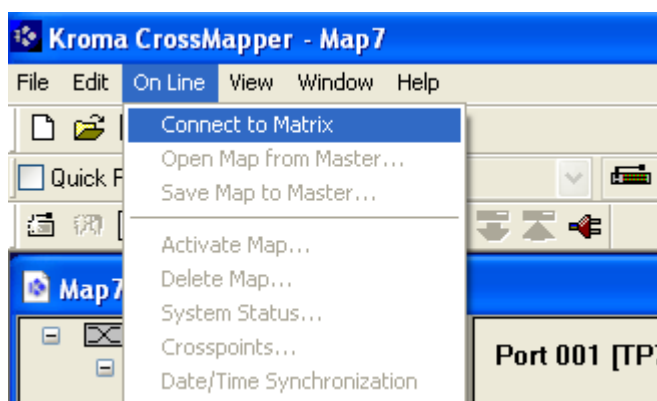


Figure 4.34 Connection to matrix

At the right lower part of the screen, there is an indicating icon about connection status. If COM port could not be opened by application or physical connection could not be established, following icon will be shown:



Figure 4.35 Connection failure

If connection has been properly established, an active connection icon and the online menu will appear:



The toolbar display the 'Online' icons active for sending and loading the maps from matrix.

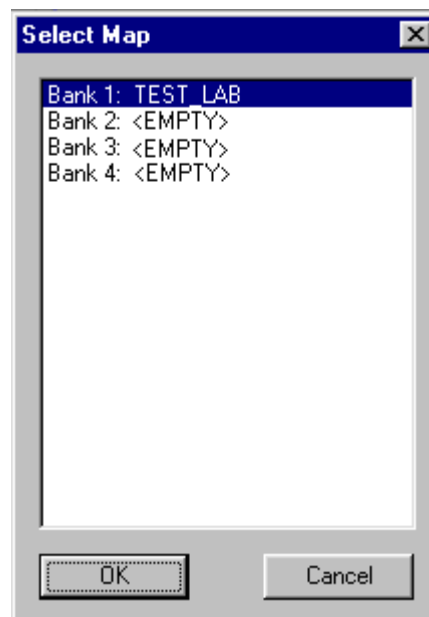


Figure 4.36 Select Map

The available options for working on-line are:

- **Open Map from Matrix** → It loads a map from matrix into the computer for editing. In the dialog box the map must be chosen.

- **Save Map to Matrix** →  It saves edited map in computer into ROM matrix. In the dialog box the map must be chosen. If the chosen bank has already a bank, it will be overwritten.
- **Activate Map** → For activating any of the 8 available maps in the ROM Matrix. In the dialog box the map must be chosen then this map is going to execute.

NOTE: Only one of the 8 available maps can run at certain moment. When another map is activated, all cross-points are deleted.

- **Delete Map** → For deleting one of the available maps. It will appear as '<EMPTY>' when a bank is erased.
- **System Status** → For displaying the system status in real time by the window of connections summary with all equipments.

System Status							
Matrix							
Matrix	Status	Type	Boards	S/N	User version	FPGA version	Observations
000	OK	TM5012		01-1M12-0001	v.1.01.015	v.2.4	
Port							
Port	Name	Status	Type	S/N	User version	FPGA version	Observations
000	PORT 000	ERROR	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	No response
001	PORT 001	OK	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	
002	PORT 002	ERROR	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	No response
003	PORT 003	ERROR	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	No response
004	PORT 004	OK	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	
005	PORT 005	OK	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	
006	PORT 006	ERROR	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	No response
007	PORT 007	ERROR	TP7010	XXXXXXXXXX	v.1.00.000	v.1.0	No response
008	PORT 008	OK	BP7100	XXXXXXXXXX	v.1.00.000	v.1.0	
009	PORT 009	ERROR	BP7100	XXXXXXXXXX	v.1.00.000	v.1.0	No response
010	PORT 010	ERROR	BP7100	XXXXXXXXXX	v.1.00.000	v.1.0	No response
011	PORT 011	OK	BP7100	XXXXXXXXXX	v.1.00.000	v.1.0	
012	PORT 012	UNKNOWN	HEADST	XXXXXXXXXX	v.1.00.000	v.1.0	
013	PORT 013	UNKNOWN	HEADST	XXXXXXXXXX	v.1.00.000	v.1.0	

Figure 4.37 Example of system status

In the window of system status appears the name of the equipment and this attributes. In normal operation, the status is 'OK'.

If the model of terminal defined in a map is different to physical equipment connected then it is inform to user with label 'WARNING'. This line is marked with green colour.

Otherwise, the equipment is not respond in that port, this line is marked with red colour and the label 'ERROR'.

If don't know the connection of any equipment in a port, then the label 'UNKNOWN' is showed.

- **Crosspoints** → For activating and monitoring the cross-points status in all system. This way the user can be active and deactivate the cross-points one to one among the inputs and outputs.

This option is available in menu 'On line->Crosspoints'.

In the window of switching, all ports are displays:

- Above Row -> The inputs.
- Left Column -> The outputs.

You may be chosen the port that you want and this is marked in yellow colour.

	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T	P O R T T
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P O R T T	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 4.38 Cross-point activation

The cross-point are activated 'click' with the mouse in the cross between ports, one to one. Each cross-point has three states:

- Deactivated cross-point → One white square between an input and output show the cross-point is not realized (the input audio do not go to output).
- Activated cross-point → One blue square between one input and output show the cross-point is realized (the input audio go to output).
- Fixed cross-point → One red square between one input and output show the cross-point is realize (the input audio do go to output) but is fixed by other element like a panel, IFB, etc.

However, if you like active cross-point of manual mode, you must be select the input and output port and with left button mouse, make 'click' over the cross square between the row and column. In that moment, have to light in red colour the cross-point (activated by fixed).

For releasing the cross-point, you turn a red square and push the left button again. Now this square will pass a white colour, for reporting that deactivation. Also, a cross-point previously activated can be fixed with the previous method (the blue colour pass to red).

This technical is valid for the audio communications in one way (half duplex): a target port listen a source port. If you want to the audio communications in two ways (full duplex), you would use to the right button of the mouse for fixing two cross-points at the same time.

5 APPENDIX

5.1 OPTIONS AND ACCESSORIES

- **PS2400X11 / PS2400X12 / PS2400X13**

External power supply unit used by the TM5012 matrix. The three different codes refer to the available wire-ends:

- PS2400X11 → Power supply unit European cable (EUR)
- PS2400X12 → Power supply unit USA/CANADA cable (USA).
- PS2400X13 → Power supply unit United Kingdom cable (UK).

The unit is an isolated commuted power source AC/DC 110~220 & 50~60Hz input and a multi-voltage output (maximum power 65w with: +5.5v/6A, +12v/3A, -12v/0.8A).

The cable ends on one side with the input of 100v-220v AC and on the other side with the cable linking to the matrix: DIN connector. See below the power source and the pins of the female DIN.

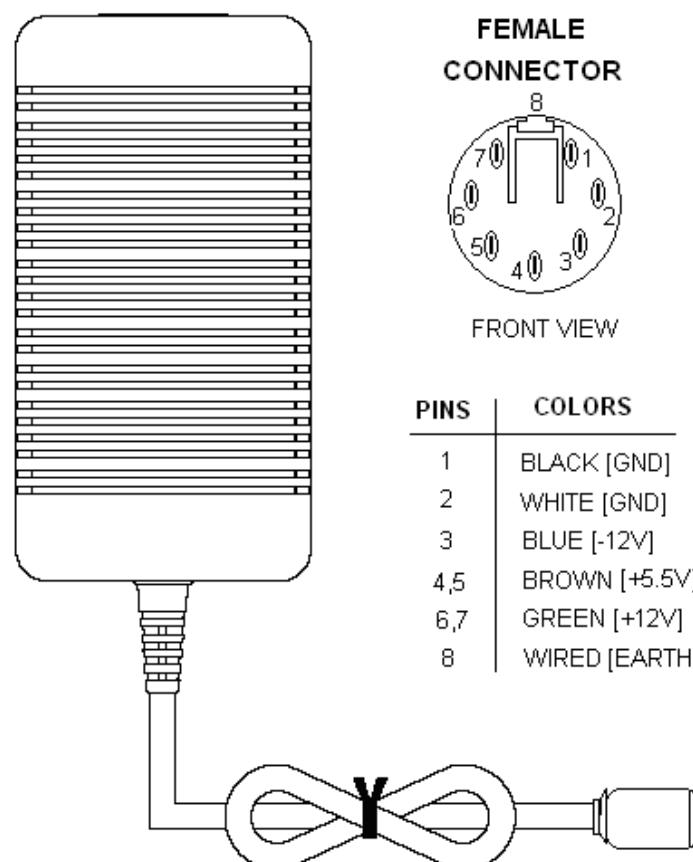


Figure 5.1 Matrix power supply unit

This power supply unit is supplied (standard) with the matrix, though it is recommended the use of a redundant power unit (this second unit needs to be ordered and purchased).

- **MC7000X03**

The one ear piece headset, is used on the matrix front microphone ports, allows both transmission and audio reception. It is not standard supply. It can be ordered as an accessory.



Figure 5.2 Headset for microphone ports

The terminal connector is Mini-XLR of 6 female pins, with a 1.5m wire length, and a connection as the one next show.

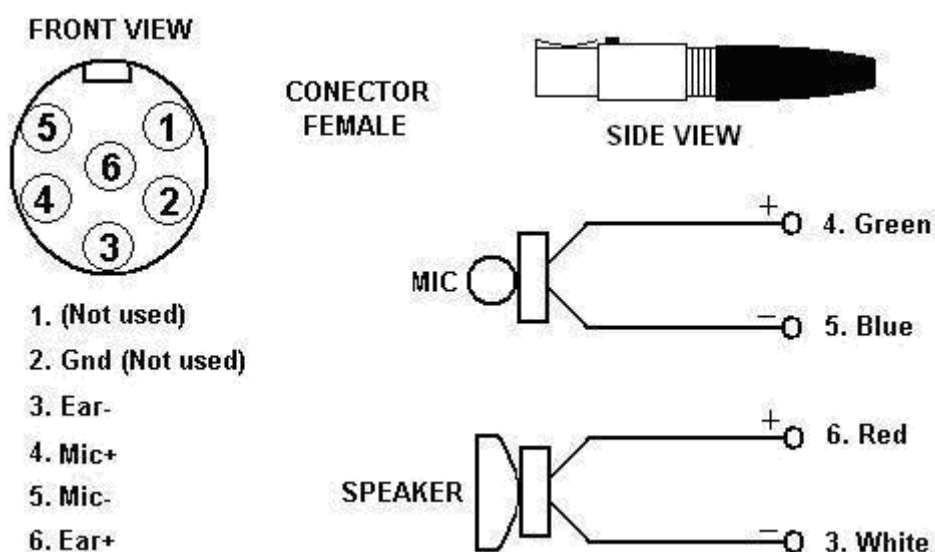


Figure 5.3 Pins connection

The following table shows the technical specifications of the microphone and the speaker:

MICROPHONE	
TYPE	ELECTRET
DIRECTIONALITY	DIFERENTIAL, NOISE CANCEL
POWER SUPPLY	3.3V
CURRENT DRAIN	Icc = 400 uA max
SENSIVITY @ 1Khz (0dB=1V/ μ bar)	Vs = -62 dB ($\pm$ 3dB)
FREQUENCY BANDWIDTH	300-3400 Hz
SPEAKER	
TYPE	ELECTRO-DYNAMIC
IMPEDANCE @ 1Khz	300 Ω
SENSITIVITY @ 1Khz / 1mW	106 dB SPL ($\pm$ 3dB)
FREQUENCY BANDWIDTH	300-3400 Hz
WEIGHT (cable included)	40 g

Table 5.1 Headset technical spec

5.2 GUARANTEE

KROMA TELECOM S.A. guarantees that the equipment (at purchasing time) complies with the purchase order's specification and that is in faultless conditions.

The warranty period is one year from date of purchase for equipment and accessories. The warranty covers repairing costs, labour and updates. This warranty does not cover freight costs, final installation or components substitution when the components' failure is due to normal use wear-out.

This warranty does not cover any fault or damage provoked by undue use; neither covers unauthorised use by non KROMA's technical staff.

In order to facilitate the procedure, contact your dealer before sending any failed equipment to the technical team.

For maintenance or support contact our technical team at BROAD SERVICE (telephone or email). For more detailed information check our web www.kromatelecom.es.



T + 34 91 661 45 14
F + 34 91 484 03 49

C/La Granja nº 80
28108 Alcobendas
Madrid – Spain

www.kromatelecom.es
audio@kromatelecom.es